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PHILOLOGICAL GLEANINGS.

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NO. VIII.

Gender, as an accidental distinction of nouns, has given rise to much litigation among grammarians.

"Gender," says Vossius, "is properly a distinction of sex; but is improperly attributed to those things which have not sex, and only follow the nature of things, having sex, in so far as regards the agreement of substantive with adjective. Sex is properly expressed in reference to male and female, as, *Pythagoras* a male, and *Theano* a female;—*ager*, a field, therefore, is improperly called masculine; and *herba*, an herb, is improperly called feminine. But *animal* is neuter, because it is construed neither way." Scaliger says, that the ancients improperly attributed sex to words; and that with respect to the neuter gender, it is absurd to attribute that to gender which is the negation of gender. Neither is it to be borne, says he, that words should be called of the doubtful gender, from the circumstance of their being sometimes used with a masculine and sometimes with a feminine construction. And Mr. Harris says that in languages where the natural sexes alone are

expressed by terms corresponding to them, very little difficulty occurs in this part of Grammar. In general, every noun denoting a male animal is masculine; every noun denoting a female animal is feminine; every noun denoting neither the one nor the other is neuter. The only exception to this general rule, is an exception which is founded in the poetical part of our nature; and it happily serves to distinguish the language of imagination from that of reality. The instances to which we allude are those in which the conception of a thing is raised to the dignity of a person, where we dwell with such fondness on our thoughts as to invest them, as it were, with life and action. *Virtue* stands before us in the enchanting form of a lovely female. *Patience* appears "gazing on kings' graves, and smiling extremity out of act."—So Shakspeare says,—

> The mortal moon hath *her* eclipse endured.

But perhaps we cannot cite a finer instance of this figurative use of gender than that which is so finely employed in Milton's description of Satan—

> ———His form had yet not lost
> All her original brightness, nor appear'd
> Less than archangel ruin'd.—

But in languages where the mere terminations of words imply, or are supposed to imply, any or all of these distinctions, it is no wonder that much confusion arises in the various modes of explaining a circumstance so foreign to the general laws of thought. "The Greek, Latin, and many of the modern tongues," says Mr. Harris "have words, some masculine, some feminine (and those too in great multitudes), which have reference to nouns where sex never had existence. To give one instance for many—*mind* is surely neither male nor female; yet is νους in Greek, masculine; and *mens* in Latin, feminine." This learned grammarian could not but perceive that "in some words these distinctions seemed owing to nothing else than to the mere *casual* structure of the word itself;" but he was of opinion that in other instances might be detected "a more subtle kind of reasoning, which discerned even in things without sex a distant *analogy* to that great distinction which, according to Milton, animates the world."

We are far from asserting that in particular instances some such analogy may not have operated. Indeed it appears to us to be of the nature of that imagination to which we owe the figurative language above mentioned; but it could only have been a rare accident, by no means capable of carrying us far toward the explanation of the principles on which language in general was constructed. Mr. Harris, it must be owned, expresses himself modestly enough, observing, "that all such speculations are at

best but conjectures, and should therefore be received with candor rather than scrutinized with rigor." With this allowance, we may therefore notice the general principle for which Harris contends, namely, that "we may conceive such subjects to have been considered as *masculine*, which were conspicuous for the attributes of imparting or communicating, or which were, by nature, active, strong, and efficacious: and that indiscriminately, whether good or bad, or which had claim to eminence either laudable or otherwise;" and again that "the *feminine* were such as were conspicuous for the attributes either of receiving, of containing, of producing, or which had more of the passive in their nature than of the active; or which were peculiarly beautiful and amiable; or which had respect to such qualities as were rather feminine than masculine." Hence he thinks it would be reasonable to consider as masculine nouns, the *sun*, the *sky*, the *ocean*, *time*, *death*, *sleep*, and *God;* and as feminines, the *moon*, the *earth*, a *ship*, a *city*, a *country*, and *virtue*. But the question, as respects the science of Grammar, is not whether any or all of these may not occasionally and accidentally be so considered; but whether there be any necessary cause connecting in our minds the conception of sex with any of them. Now, there can be no other such cause than *personification*, because sex is a personal distinction; but even that cause does not universally apply to any of these conceptions. God, indeed, our creator and preserver, we usually and properly regard as a person; and there the reasoning of Mr. Harris is so far just, that we cannot easily view the Supreme Being as a female; for even in those heathen mythologies which abound with female divinities, the chief and sovereign Deity is always represented as masculine. But Mr. Harris himself admits, what indeed the common experience of every day sufficiently proves, that we often contemplate this ineffable conception without any reference to sex, or even to person, calling it *Deity*.—It must be remembered, that personification was more common among the ancients than the moderns. The Greeks actually worshipped Sleep and Death in the form of men: Virtue was portrayed before their eyes by the statue of a female. Nor must we forget that many of the personifications have been handed down to us from them by mere tradition and the language of the poets. Thus it is difficult for us, who have seen Fame and Victory so often delineated as females, on ancient medals, and in sculpture, who read them as such in poetry, and know that Fama and Victoria are nouns of feminine termination; it is difficult for us when we do personify these airy beings, to figure them to ourselves as men, in a different habit and form, with different accompaniments, and expressed by words and sentences of a different character and construction. But there are comparatively few things which we personify in our common prose: and when we do so, the change of the form of words from

neuter to masculine or feminine, at once and powerfully marks the transition of the mind from cold matter of fact to ardent imagination. This, however, is again an accidental circumstance appertaining to the particular history of the English language, and not to the philosophy of language in general.

There is a curious difference of opinion between SANCTIUS and HARRIS. The former writer asserts "that proper names of *men, cities, rivers, mountains*, and the like, do not admit of grammatical gender:"—Whereas the latter author says "both number and gender appertain to words. Number, in strictness descends no lower than to the last rank of species: gender, on the contrary, stops not here, but *descends to every individual*, however diversified." This apparent contradiction between two eminent writers is nevertheless easily reconciled. Harris attributes gender to words as significant of the conceptions of the mind. Sanctius, on the other hand, following the authority of Varro and Diomedes, considers grammatical gender as relating only to termination or construction of words. The reason which this author assigns for his doctrine may do, when Grammar is considered as an art, but not as a science. "The object of Grammar is not to explain the *signification* of particular words, but their use. Now, though the mere signification of words is not the object of Grammar, the mode of signification is so far from being an immaterial part of that science, that *it is its sole foundation.* There is no doubt that the expression or non-expression of the distinction of sex in connection with other conceptions, must affect the relations of language considered as significant, and consequently must fall under the science of Grammar, according to the definition of it which we have adopted.

Regarding only the science of Grammar, as dependent on the nature of thought, it is manifest, that those conceptions which are of a nature to coalesce, in reason or fancy, may be considered either distinctly or in absolute union. Thus, the conception of *number* and that of *soldier* are absolutely united in the conception of *army*, or *regiment*, or *troop;* the conception of *royalty* and that of *man* are absolutely united in that of *king*, and so the conception of *sex* and that of *child* are absolutely united in the words *boy* and *girl.* This sort of union gives occasion to many classes of words in most languages; as *horse* and *mare, ram* and *ewe, bull* and *cow*; but there is a second class in which the same distinction is expressed by the compound form of the word, as *shepherd* and *shepherdess, milliner* and *man-milliner*, and lastly, the sexual quality is often expressed by its proper adjective, as the *male* and *female* elephant; the *male* and *female* rhinoceros.

There are some conceptions in which that of sex is tacitly included, but may not be absolutely determinable, or may not require to be determined for the purpose of communicating thought. Thus

a *child* is either a *boy* or a *girl;* but if we are reasoning upon the education of children generally, many thoughts may occur to us which indifferently and equally relate to *boys* and *girls*, and in expressing which we may therefore use the neuter word *child.* And perhaps this consideration alone would afford a sufficient answer to those persons who contend, like Hobbs, that the general word *man* is no more than the representation of some particular man in my memory or imagination: for if the word *child* in my thoughts represented a *boy*, it could not represent a *girl*, and vice versa; whereas we see in practice that it represents the two contrary sexes at the same time, without the least difficulty, and serves the purposes of reasoning quite as well, and oftentimes better, than if we had employed different words for the two *sexes.*

Lastly, there are conceptions, which in reality have nothing to do with sex, but which, from various causes, principally depending on imagination or habit, we are apt to consider in connection with notions of sex. Thus the English sailor, who has contracted a sort of affection for the tight vessel in which he has braved the winds and waves; and who sees in her neat trim and gallant tackling the elegance of female apparel, is habitually led to speak of her as a female. Who has not been electrified with the feeling expressed in the old sea-song—

> "*She* rights, *she* rights, boys—we 're off shore!"

As passion is a necessary part of our nature, and as it necessarily gives a hue and tinge to our conceptions, so it forces us to modify accordingly the forms of expression in language. Unhappy is the critic who knows nothing of this part of Grammar;—he will not only miss some of the finest beauties in the poets, but if he attempt to correct what he thinks faulty, he will display, in the most ridiculous light, his own want of taste. Mr. Harris has finely exemplified this remark, by a quotation from Milton—

> At his command th' uprooted hills retired
> Each to *his* place: they heard his voice and went
> Obsequious: Heav'n *his* wonted face renew'd,
> And with flowrets hill and valley smil'd.

"Here," says Mr. Harris, "all things are personified: the hills hear, the valleys smile, and the face of heaven is renewed. Suppose, then, the poet had been necessitated by the laws of his language (or we may add by the correction of the critic) to have said, Each hill retir'd to *its* place. Heaven renewed *its* wonted face—how prosaic and lifeless would these neuters have appeared; how detrimental to the prosopopeia which he was aiming to establish! In this, therefore, he was happy, that the language in which he

wrote imposed no such necessity, and he was too wise a writer to impose it on himself.

We come now to the expression of the relations of nouns to each other, which is effected by declension, or *case*, if the relation and conception coalesce, in one word, and by a preposition in different words. By this short statement we shall easily discover our way among the disputes of grammarians relative to the cases of nouns. Declension is commonly used for the variation of case.

It was long disputed what number of cases existed in the Latin language. These are thus enumerated and explained by PRISCIAN: The first is called the *right* or *nominative* case; for by this case, naming is effected; as this *man* is called *Homer*, and that *man Virgil*. The reason that it is sometimes called the *right* or *straight* case is, that it is first formed naturally by merely laying down the word, and then the other cases formed by flexion from this, are called *oblique*. The next is the *genitive*, which is also called by some the *possessive* or *paternal*. The word *genitive* is either derived from *genus* a race, because we signify by it the race to which any one belongs, as "he is of Priam's race," or from *genero* to generate, because from this case are generated many other words and parts of speech, at least it is so in the Greek language. Again, it is called possessive, because we signify possession by this case, as "Priam's kingdom," or the "kingdom of Priam:" whence possessive adjectives may also be construed by this case: for what is "the *Priamerian* kingdom" but "the kingdom of Priam," or "Priam's kingdom." It is called *paternal* for similar reasons, because the father's name is thus expressed, as "Priam's son;" and hence patronymic names may be resolved in this case, as "Pelidan Achilles" is the same as Achilles the son of Peleus.*

* The word *Johnson* was manifestly in origin nothing more than *John's son*. Thus in all languages have been formed *patronymics*, the most ancient of all family names. The Romans adopted it: Thus, *Cæcillius* was *Cæculæ uios*, *Julius* was *Juli uios*, *Æmillius* was *Æmilli uios* etc. Mr. Tooke says, "I think it worthy of remark that whilst the old patronymical termination of our northern ancestors was *son*, the Sclavonic and Russian patronymic was *of*. Thus whom the English and Swedes named *Peterson*, the Russians called *Peterhof*. And as a polite foreign affectation afterwards induced some of our ancestors to name *Fitz* (that is, *fils* or *filius*) instead of *son*; so the Russian affectation, in more modern times, changed *of* to *vitch*, (that is, *fitz*, *fils* or *filius*) and *Peterhof*, became *Petrovitch* or *Petrowitz*. The Irish patronymic *O'* may possibly be of the same origin as the Russian *of*. The Welsh *'P* is well known to be *ap*, an abbreviation of *map*, a son, as *Price* for Ap Rhys, *Powell* for Ap Hoel, etc. The Scottish highlanders used the cognate word *mac*, a son, for their patronymical prefix; as in *Mac Donald*, that is, the son of Donald, *Mac Kenzie*, that is, the son of Kenneth, etc.; while the lowland Scotch used still a different mode of expressing the same thing, by prefixing to the son's name the genitive case of the father's, as *Watt's Robin*, for Robert the son of Walter, *Sim's Will* for William the son of Simon, whence arose such family names, *Watts*, *Sims*, and the like: and so much for the particles *son*, *ius*, *fits*, *of*, *vitch*, *mac*, *O'*, *'P*, and *'S*.

The following case is the *dative*, which some term the *commendative*—as, "I give a thing *to* a man," or, "I recommend a person *to* a man."

Fourthly comes the *accusative* or *causative;* as, "I accuse a man," or "I (as a cause) make a thing."

The fifth is the *vocative* or *salutary;* as "O Eneas!" or "Hail Eneas!"

The *ablative* is also called the *comparative;* as "I take *from* Hector," or "I am stronger *than* Hector." Each of these cases, moreover, has other different uses; but they have received their names from their most general and familiar use, as we see happen in many other things.

From this enumeration, it is observable that the sort of declension which the ancients called *case*, not only expressed the relation of nouns to each other, but also that which they bore to verbs, as agent or object; and lastly, their use in the expression of passion, without reference either to another noun or to a verb: in order to explain the reasons of which it will be necessary to observe, that the meaning of the word *casus*, which we render *case*, is properly, the falling or declining from a perpendicular line. Thus, if the simple notion of the noun be supposed to be expressed by an upright straight line, as in the letter I, the other cases may be supposed to be expressed by lines obliquely declining one way or the other, as in the letter V.

It was long disputed among ancient grammarians, whether the nominative should, or should not be called a case. On the one hand it was urged, that conceptions are only expressed by speech, in some one of the forms called cases, including the nominative; and that of the forms, the nominative expressing the *agent* of the *verb active*, was the simplest, and was therefore used whenever there was occasion simply to name a thing or person. Thus we should not say, that the name of the person slain by Marcus Brutus, was *Cæsaris*, or *Cæsari*, but *Cæsar*. Those on the contrary, who called it a case, contended that every expression of a conception in speech, was a declension, or falling away from the simple conception in the mind, which taken by itself does not imply either action, or passion, or relation. Thus, before I can assert any thing whatsoever of Cæsar, I must form the conception or thought of *Cæsar*, as a person; but when I put that thought to another, when I mention the wife *of* Cæsar, or the friends who were faithful *to* Cæsar, or those who revolted *from* Cæsar; or assert that "Cæsar conquered," or that "Cæsar was killed;" or express a feeling of any sort by the exclamation "O Cæsar"—on these and such occasions my conception declines from its original simplicity, and consequently my expression should be said to decline, or fall away from the pure noun. They added, moreover, that it was not always the simplest form of the noun, but was sometimes more

distant from the radical, and therefore, more deserving of the appellation of oblique than some other cases; as, for instance, the vocative or ablative, which latter some writers have considered as the primary and original case of the noun.

Since the notion of action implies the notion of an agent, there must be a form of the noun which denotes the agent to every verb in a simple sentence. The action, however, may be represented as proceeding from the agent, or as received by the object. On the former supposition, it becomes a *verb active*, and the nominative case is the form of the noun which denotes the agent. On the latter supposition, it becomes a *verb passive;* and the nominative case is the form of the noun which denotes the object. Thus, "*Cæsar fights*," "*Cæsar is killed*," are two simple sentences, in both of which *Cæsar* is the nominative case. In the former, the word *Cæsar* signifies the agent that *fights;* in the latter, the same word Cæsar signifies the object that is killed. In both instances the nominative is essential to the completion of the sentence; for when we speak of fighting, as proceeding from an agent, we must necessarily express that agent; and when we speak of being killed, as received by an object, we must express that object. Hence the Rule, that the nominative answers to the question who or what; as "Cæsar fights."—Who fights?—Cæsar. "Cæsar is killed."—Who is killed?—Cæsar. It is justly observed by Mr. Harris, that the character of the nominative may be learnt by its verb. The action implied in the verb *fights*, shows the nominative *Cæsar* to be an active efficient cause. The suffering implied in the words "*is killed*," shows the nominative *Cæsar* to be a passive subject or nominative. There are some beings which may be considered in both these lights; as Cæsar is active in the one instance, and passive in the other. But there are others which cannot, except figuratively, be considered otherwise than as passive, and, consequently, can only become nominatives to passive verbs; as we may say, "the house is built;" but we cannot say, "the house builds."

The nominative is the most essential of all cases; and it has therefore been described as "that case without which there can be no regular and perfect sentence." With respect to those sentences in which we make the word *it* serve for a nominative, and which the Latins used without any nominative at all, as *pluit*, "*it rains;*" "*tœdet me*," "it wearies me," or "I am wearied;" these are imperfect sentences, which we shall hereafter consider separately. In all other instances, although it may not be necessary to express the object to which an action is directed, or the agent from which a suffering proceeds, yet the converse is absolutely necessary; thus, when we say, "William builds," it is not necessary to add "a house," or "a church;" but if we say "builds a

house," or "builds a church," it is necessary to prefix the name of the builder.

In order, however, to extend and enlarge a sentence, it often becomes necessary to state the *object* of a *verb active*, or the *agent* of a *verb passive*. Hence arises the necessity for two other cases, which have been called the accusative and the ablative. When we say there is a necessity for such cases, it will be understood, from what we have before observed, that we do not contend for the necessity of any particular terminations, or inflections, or prepositions, or arrangement of words, to make these varieties of case; we only mean, that it is necessary, that by some means or other, the *noun*, which indicates the conception, should be placed in such or such a relation to the *verb* which constitutes the *assertion*. It may happen, and in point of fact, it does happen in some languages, that there are no inflections of case; but there are means in all languages of determining when a noun is the *object* of an *active*, or the *agent* of a *passive verb*.—In our sense of the word case, then, the *nominative*, that is, the *agent* of the *active* or *object* of the *passive verb*, may be called the primary case; and the secondary cases are the accusative and the ablative, in so far as they perform the functions above noticed. These two cases, it is to be observed, are respectively convertible with the nominative, by a change of the *verb*, from *active* to *passive;* for "James loves John" is convertible with "John is loved by James;" the accusative of the first being the nominative of the second, and the nominative of the first being the ablative of the second.—So the matter stands in the simpler combinations of thought; but let us consider what is to be done, if in one and the same sentence we wish to express not only the *agent* and *object* of any action, but also the *end* to which the action is directed; the cause on account of which it happens, or the instrument, mode, and circumstances of its performance. For these purposes, it is necessary, that the conception of such end, or cause, or instrument, etc., should be expressed by a noun; and that some means should be adopted to show whether the *noun* was meant to stand in the relation of end, cause, or instrument, or in any other relation to the *verb*. It is, as Vossius justly observes, quite impossible that any language should have separate inflections for all these relations, and therefore some of them are, in most languages, represented by separate words, or particles, commonly called prepositions; but others are often expressed by inflections, the number and diversity of which vary exceedingly in different languages. Thus, in the Sanscrit, there are separate inflections to signify the end, the instrument, the source, and the situation, answering to our prepositions *to*, *by*, *from*, and *in*. In the Latin language, a particular inflection is used to signify the *end* to which an *action* is directed, and the *case* known by that inflection is called the *dative;* because *verbs*

of giving usually signify the expression not only of the thing given, but of the person to whom the gift is made, and whose convenience or benefit is the end to which the gift is destined. In order to express the other relations above noticed, the Latin language avails itself of the accusative or ablative inflection, either alone or with a preposition.

Thus have we noticed three classes or degrees of relation in which the *noun* may stand to the *verb;* but it may also be related to another *noun*, as depending on, or belonging to it. Thus the words "Priam's kingdom," "the son of William," mark a dependence of *kingdom* on *Priam*, and of *son* on *William.* This relation is expressed by a separate inflection in Greek, Latin, English, and many other languages; and is commonly called the *genitive* or *possessive* case. Now the use of the genitive case in nouns differs but little from the use of an adjective. It expresses one conception, as dependent on another, and the expression of the latter serves to individualize and specify the former. The dependent conception is, therefore, in fact, a mere attribute of the other, and consequently the genitive is easily convertible into an adjective. Thus in Latin, "regis sceptrum," "*the king's sceptre,*" are easily converted into "sceptrum regium," "*the kingly sceptre.*" Dr. Wallace considers the English genitive case as a possessive adjective; as, "the king's court," aula *regia*, where he differs from all other English grammarians, in calling the word *king's* an adjective. On the other hand Dr. Lowth reckons the words *mine* and *thine*, which are usually called adjectives, as the possessive cases of *me* and *thee.* It is, perhaps, from a similar cause, that Dr. Edwards asserts that the Mohegan Indians have no adjectives at all in their language; a fact upon which Mr. Tooke lays great stress, but which, in reality, proves nothing as to the signification of language, whatever it may do as to its forms or inflections.

It seems hardly necessary to distinguish the vocative case by any particular inflection. Indeed, we find the terminations of the nominative and accusative equally employed in Latin as exclamatory: and it is said that the Sancrit grammarians do not allow the vocative to be a case. Yet, when we are speaking of the different relations in which a noun may stand to other words in a sentence, it is impossible to overlook its use in those sentences where it stands forth prominently as the object addressed or invoked. Thus, in the first ode of Horace, we find two verses almost wholly occupied with vocatives:

> Mæcenas, atavis edite regibus,
> O, et præsidium, et dulce decus meum!

THE PAST AND THE PRESENT.

BY JOHN W. PICKET.

PART I.

It seems to be a law of the human mind to trace effects to causes. Hence hypotheses arose as soon as mind began to take cognizance of things around it. The works of creation claimed the early attention of mankind, and led them to attempt an investigation of the laws by which they are governed. But the means must be adequate to the end. Time, observation and experiment are necessary to develop and confirm any of the great truths of Nature. Mere abstraction and generalization cannot accomplish the object. All the knowledge we possess is founded upon experience. It is from this source we draw facts, and the comparison of these leads by induction to the development of general laws. It was in this manner, that Newton proved the existence of universal gravitation, and that this force, governed by a certain and invariable law, is the same whether it acts to bring falling bodies to the earth's surface, or to cause the planets and their satellites to be retained in their trajectories.* This great discovery, as well as all others pertaining to physical truths, flowed from facts, and an uninterrupted chain of inductive reasoning.

All who are conversant with the nature of the human mind, know how slow is its progress towards truth, whether we regard it as the object of our search in the properties and laws of matter or of mind. The failure of the ancients in becoming deeply acquainted with physical science cannot be attributed to any deficiency of intellectual power; for, so far as force and originality of mind are concerned, it is questionable whether they have been surpassed, or equalled by the moderns. Their eloquence, their poetry, their sculpture are still esteemed indications of capacious and transcendent genius. Their metaphysics have cost the labor of centuries to overturn, and their geometry remains a model of reasoning—of pure intellectuality. In the earlier ages of the

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* The discoveries of Huygens, says Hutton, may be ranked among the greatest benefits that have been conferred on science. His investigations of the Cycloid, and his doctrine of Central forces, were the immediate foundation of Sir Isaac Newton's improvements.

world, all was blooming and fresh; and if, as Lord Bacon represents it, antiquity be but the childhood and youth of creation, it is nothing more than we might expect that at that period of its existence, imagination should prevail over reason and experiment, and that the calmer and more successful exercises of the latter, should not unfold themselves till a later period.

The want of intellectual energy was not then the cause of the circumscribed knowledge of the Romans and Greeks of physical science. It was, so far as we can gather from the records which time and barbarism have spared, because they had no solid general principles, and these, as we have intimated, they did not possess, as they had not previously studied particulars. It was on this ground, the ancient philosophers were lost. They sought a knowledge of physical nature through metaphysical reasoning; nor did they properly discriminate between physical and efficient causes. "With them philosophy was esteemed the science of causes, and by these they meant such antecedents as were *necessarily* connected with effects, and from an acquaintance with which the effects might be foreseen and demonstrated."* They aimed to deduce the phenomena and laws of nature, rather by synthetic reasoning than by endeavoring to find out established conjunctions between successive events, and reducing them to general principles.

The hypotheses of the ancient philosophers, are generally looked upon, at the present day, as the dreams of visionaries, and as indications of intellectual weakness. But they who entertain this opinion, do not sufficiently reflect upon the circumstance, that numerous centuries have elapsed since their time, during which the moderns have had not only their labors but those of many thousands of other minds to aid in the superstructure of the present fabric of science. The days of hypotheses were not, however, confined to remote ages. If the doctrine of Thales,† that water

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* Stewart's Philosophy of the Human Mind.

† The principle of all things was a subject of especial research by the philosophers of Greece. It may satisfy curiosity to know their opinions on this point.

Anaximenes taught that this principle consisted of.....Water.
Thales.....Water.
Anaxagoras.....Infinite air.
Pythagoras.....Unity.
Archelaus.....Matter and Spirit
Heraclitus.....Fire.
Democritus.....Atoms.
Plato.....God, Idea and Matter.
Aristotle.....Matter, Form and Privation.
Epicurus.....Matter and Empty Space.
Zeno.....God and Matter,—the only things without beginning.
Epimenides.....that the two first principles are Air and Night.
Sanchoniathon.....that a condensed air or wind and a turbid chaos, like Erebus, from whose union mot or mud was produced.

was the principle of all things, or, of Heraclitus that fire was that principle, or of Aristotle, that its essence was matter, form and privation, is deemed chimerical, we may easily find its counterpart in the notions held, as late as the sixth century, by Cosmos Indopleustes, of the earth and the heavens, and in the labors of the alchymists from Geber and Valentine* down to Digby,† of the seventeenth century. The opinion that life might be infinitely prolonged by the virtues of the philosopher's stone, so eagerly sought by the alchymists, or, that certain preparations of gold would impart to the human system, the durability of that metal, or, the vortices of Descartes, or, the wild conjectures of De Maillet and Kepler,‡ are equally as absurd as the theogony of Hesiod, or the metempsychosis of Pythagoras. The truth is, that all nations have their reveries, and like those of individuals, they give place to realities when facts are guided by reason and experiment.

In looking upon remote ages, we are apt to consider all knowledge and wisdom as belonging to our own times. But those who have passed into another existence, and over whose memories centuries have rolled, had arrived at the same conclusion; and it is probable, that some of the sciences which we now deem of high perfection, may, by future generations, be viewed in a very differ-

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* Basil Valentine wrote about the middle of the 15th century. He may be classed among the founders of modern chemistry, although his writings are strongly tinctured with Alchymy. He may be viewed in the double light of chemist and physician. He gave to the world many valuable preparations of antimony, and may be considered the discoverer of sulphuric acid (oil of vitriol), nitric acid (aqua fortis), and muriatic acid, which, at the present day, are extensively used in several of the most refined mechanic arts. Brande's Chemistry.

† It has been said that the celebrated Descartes supported the alchymistical opinions of Sir Kenelm Digby. If so, his belief was as groundless as his attempt was unphilosophical to explain the *cause* of the refraction of light by the resolution of forces on the principles of mechanics.

‡ Cuvier says, that some writers have reproduced and greatly extended the ideas of De Maillet. They say that, at first, every thing was in a state of liquefaction; that the liquid engendered animals of the simplest kind, such as monads, and others of the infusory and microscopic species; and that, in progress of time, these animals complicated and diversified their species into those now existing.

Other writers, like Kepler, assign vital powers to the globe; each of its component parts has life. Not only the very elementary atoms have instinct and will, but every sort of mineral can convert immense masses into its own proper nature. Mountains are the organs of the respiration of the Globe, and the schists, the secreting organs. Cuvier's Fossil Bones. 5. 1. p. 41.

The ideas of Kepler are a new version of the Stoical doctrine, blended with Plato's suggestion, that the fixed stars were divine animals, and that the earth was a living being. He published his Harmonics in 1619, "in which he expounds his notions of Astrology; and while he strongly condemns the *absurdities of the vulgar belief*, attempts to substitute a system of *celestial influences*, in which he seriously represents the earth as an *enormous living animal*, the tides being its act of respiration, and its vital sympathies being excited by the configurations of the planets." Powell's His. Nat. Philos.

ent light, and as nothing more than the mere elements of some great theory. We are perhaps little more exempt from error than those of past ages, when we enter upon any hitherto untrodden field of science, and from the mass of absurdities which spring up in the ardor of its first cultivation, we may naturally expect the evolution of some truth, which, as time rolls on, will receive from successive minds, constant accumulations. It has been thus, that the present fabric of science has been reared; and if it continue to advance, what an unbounded prospect of intellectual improvement and acquisitions lie before future ages. "Nor is this opinion derived from mere theory. If any, however, should doubt this progressive improvement, we take as one example to show what we mean, the history of that science in which the advances of discovery are the most certain, and in which they may be measured with the greatest precision. Those elementary truths of Geometry and Astronomy which in India and Egypt, formed an occult science, upon which an ambitious priesthood founded its influence, were become, in the times of Archimedes and Hipparchus, the subjects of common education in the public schools of Greece. In the last century, a few years of study were sufficient for comprehending all that Archimedes and Hipparchus knew; and at present, two years employed vigorously under an able teacher, carry the student beyond those conclusions, which limited the inquiries of Leibnitz and Newton. Let any person reflect on these facts; let him follow the immense chain which connects the inquiries of Euler with those of a priest of Memphis; let him observe, at each epoch, how genius outstrips its age, and how it is overtaken by mediocrity in the next, and he will perceive, that nature has furnished us with the means of abridging and facilitating intellectual labor, and that there is no reason for apprehending that such simplifications can ever have an end. He will perceive, that, when a multitude of particular solutions and of isolated facts, begin to distract the attention and to overcharge the memory, the former are gradually resolved into one general method, and the latter into one general law; and that these generalizations continually succeeding one another, like the successive multiplications of a number by itself, have no other limit than that infinity which the human faculties are unable to comprehend."*

In the present condition of science, the contemplative mind often retrospects the steps by which it has advanced to its present state, and derives pleasure and instruction, in tracing modern improvements to their parent discoveries, and these to their remote sources. It is the object of this article, in reference to this, to

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* Condorcet, as quoted by Dugald Stewart in his Philos. of Mind.

bring under notice some of the opinions of the ancients; to mark how near an approximation may be made to truth without its actual attainment; to note their revival by later times, and to point out how one discovery leads to another. In doing this, it is not to be understood, that we claim a superiority for the ancients in any department of physical science; much less that they had that correct knowledge of the moral duties which it is now in the power of human beings to possess from that great fountain of light and truth, the revelation of God.* It is owing to the wonderful progress of the former and the unbounded influence of the latter, that modern times are so eminently in advance of those long past. Were it not for these, every thing would be in as much doubt and obscurity, as it was in the days of Carneades and Leucippus, and our ideas of God and the universe would still be involved in the same inconsistency, as they were at that time,

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*It may not be improper here to remark, that the Platonic philosophy appeared so consistent with the Mosaic, that many of the primitive fathers follow the opinions of that philosopher, as being favorable to christianity. Justin is of opinion that there are many things in the works of Plato which he could not learn from mere natural reason, but thinks he must have gotten them from the books of Moses, which he might have read while in Egypt. Hence Numerius, the Pythagorean, expressly calls Plato the Attic Moses, and upbraids him with plagiarism; because he took his doctrine concerning God and the world from the books of Moses. Theodoret expressly says, that he has nothing good and commendable concerning the Deity and his worship, but what he took from the Hebrew theology; and Clemens Alexandrinus calls him the Hebrew philosopher. Gale is very particular in his proof of the point, that Plato borrowed his philosophy from the Scriptures, either immediately or by means of tradition; and besides the authority of the ancient writers, he brings many arguments from the thing itself.

St. Augustine commends the Platonic philosophy; and even says that the Platonists were not far from christianity. It is also certain, that most of the celebrated fathers were Platonists, and borrowed many of their explanations of Scripture from the Platonic system.—Towards the end of the second century, a new sect of philosophers arose, called the Modern Platonists, spread through the greater part of the Roman Empire, swallowed up all the other sects, and proved very detrimental to christianity.

Hutton's Math. and Philos. Dict.

All, or nearly all, the ancient schools of philosophy taught the belief of the eternity of matter. Democritus, for example, taught that it was intelligent in some of its particles, and unintelligent in others; Aristotle and others, that it was intelligent as a whole, but unintelligent in its separate parts, and Epicurus, that whether united or joined, the parts and the mass, were unintelligent. The absurdity, as they supposed, that an actual substance could be created out of nothing, led undoubtedly to this belief. The Romans received it from the Greeks who, according to Good, became acquainted with it as a branch of the gymnosophy of the east, and constitutes, even, at this day, a distinct doctrine of the Brahminical religion. This reasoning was embraced by many of the Jewish Theologians and not a few of the Christian Fathers who were too much influenced by Platonic principles. An idea, however, of the creation of matter by the energy of a *pure intelligence* is occasionally to be met with, and was probably a remnant of patriarchal tradition. The Tuscans entertained such an opinion, and it is frequently referred to by the leaders of the different schools. The world indeed stood in need of a revelation.

Good's Book of Nature.

hadn ot sound science and divine truth given new light to the judgment, new principles to reason, and new motives and sympathies to the human heart.

PART II.

The doctrine of the sphere was one of the most prominent subjects which engaged the attention of the ancient philosophers, and which gave rise to many and conflicting opinions among themselves. Whatever ideas, at first, they may have entertained, we believe may be considered as fragments of patriarchal tradition, or, may be traced to the Chaldeans or Hindoos;—the scattered remnants of whose knowledge were gathered by the Greek scholars during their travels in those countries, were brought with them on their return to their native soil, and again laid the foundation of science and literature, on which, modified and improved, modern nations have raised their splendid and solid edifice of learning and philosophy. In referring, then, to this point, we shall glance at the origin of Astronomy in Greece, in doing which our remarks will receive some verification.

Thales, born at Miletus in Ionia, 644 years before Christ, may be considered the founder of Astronomy in Greece, which was afterwards successfully cultivated by the disciples of the Ionic school. The only writers prior to his time, any of whose works have come down to us, are Homer and Hesiod, by some ranked as cotemporaries. If, from their works, we form an estimate of astronomical science as it was in their time, we have reason to believe, that its condition was very circumscribed. They say little of the celestial bodies, and the only constellations and stars which they have named, are the Bear, the Pleiades, the Hyades, Arcturus, Orion, Bootes, by the former, and Sirius, by the latter. The planets are not distinctly named by either; and in fact, if we take Seneca as authority, they were not astronomically observed, till long afterwards in Greece. *Eudoxus*, says Seneca, *quinque siderum cursus primus in Græciam ab Egypto transtulit.*

Before the time of Thales, it does not appear, that the Greeks were acquainted with the Sphere, and most if not all the ancient writers concur in the statement, that he invented the Zodiac,*

* J. W. Herschell says there is no doubt, that the Grecian Zodiac was borrowed from Egypt or Chaldea. The zodiac of the Chaldeans was divided into 12 signs, each sign into 30 degrees, and each degree into 60 minutes. The extra-zodiacal constellations were 24 in number, 12 in each hemisphere. To this we may add from Herodotus, that to them we owe the duodecimal division of the day, the invention of the Gnomon and an instrument called Polus. The gnomon was used in China from the earliest antiquity; of the polus we have but an imperfect knowl-

discovered the solstices and equinoxes, the obliquity of the Ecliptic; divided the heavens into five zones, and recommended the division of the year into 365 days, which was the civil year of the Egyptians, and who were very early acquainted with the more accurate value, 366¼ days. We may reasonably infer, that the Greeks were not much advanced in astronomical science, from the fact, that Diogenes Laertius makes direct mention, that Thales introduced into Greece the knowledge of the Little Bear, previously to which the Grecian seamen had directed their vessels by the Ursa Major, or Great Bear. According to Strabo, the Phenicians had long navigated their ships by the former constellation, and as Thales is known to have been among them, there is every reason to believe that he derived his knowledge of it from that people.

Thales, according to the testimony of Herodotus, himself an Ionian, and a native of Halicarnassus, was a Phenician by birth or extraction, and his country was not far distant from Chaldea. This we mention in connection with the fact, that he was the first among the Greeks, that predicted and verified a solar eclipse. Diogenes Laertius, Plutarch, Pliny in his Natural History, and Cicero De Divinatione, bear direct evidence of this circumstance. If then, there be no reason to doubt, that he foretold an eclipse of the sun, and its future occurrence, and explained the causes of these solar phenomena, and if we take this in connection with the fact, that before his time, the Greeks were very unadvanced in astronomy, we are led to the conclusion, that he borrowed his method of calculation from some other people well acquainted with this science. These people were either the Egyptians, or, more probably, the Chaldeans. For, it is evident, he could not invent a method by which so complicated a process could be carried through, unless he had data, or, in other words, a long series of observations, and these, too, conducted consecutively and correctly. It is known from modern discoveries, that the Chaldeans possessed these materials, and also a method of calculation. It has been remarked that he was at least descended from Phenician parentage, and by some of the ancient writers it is asserted, that he, like Pythagoras, penetrated into the east as far as India in search of knowledge. We

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edge. It seems to have been destined to indicate the changes in the Sun's meridian altitude towards the solstices. The divisions of time were measured by clepsydræ.

The Chinese and Indians (of Asia) divided their zodiac in a similar manner to each other; the former into 28 the latter into 27 constellations; to which number they were probably led by observing the moon's revolution to take place in something between 27 and 28 days. Subsequently both seemed to have become acquainted with a division of the zodiac into 12 signs; but this division was purely mathematical, the constellations of the zodiac remaining unchanged.

Herschell's Astron.

have reason then to believe, that his discoveries of the zodiac,* the obliquity of the ecliptic, and the circles of the sphere, were originally derived from the Oriental nations, and carried by him into Greece.

We have said this much on the subject; and the remarks will measurably apply to Pythagoras, of whom it may be further added, that independently of his metaphysical doctrines which are evidently of Indian or Egyptian origin, we may state, that he also borrowed his ideas of the nature of Comets from the Chaldeans, who, like him, believed them to be solid bodies, forming a part of the system of the universe, revolving round the sun in very eccentric orbits, and visible only in certain parts of them.

After these observations, we proceed to the doctrine of the sphere, as taught by Pythagoras. Independently of his acquisitions in mathematics, in which he invented many theorems, particularly the 32d and 47th of the first book of Euclid, and that one in which it is shown, that only three regular polygons or figures† can fill up the space about a point, it is allowed by eminent writers, that he made great advances in astronomy. Whether what he taught, were the gathered fragments of some splendid theory of astronomical science, and to be regarded in that light, as the poems of Homer may be, as a remnant of lofty literature that had long perished, or whether they are to be considered as the inventions and discoveries of his own mind, is not at this moment material. He is the first one among the Greeks that is known, who maintained the true system of the world, which places the sun in the centre, and makes the planets revolve about him.‡ He taught the sphericity of the earth, and that the people had antipodes. This opinion was enlarged by his pupil, Philolaus‖ of Cro-

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* The zodiac of India is nearly identical with that of Greece, and Humboldt, whose opinion is confirmed by that of Macrobius, has shown that the 12 Indian signs are taken from among the 27 lunar mansions, or constellations of the lunar zodiac. Hers. Astr.

† It is asserted by Plutarch, that Pythagoras was the first who found out the area of the Parabola.

The quadrature of curves belongs to the higher Geometry. The lunes of Hypocrates are believed to be the first curves that were squared. Euclid gave a good method of approximating to the area of a circle by describing a polygon between any two concentric circles, however near their circumferences might be to each other. By the aid of conic sections, at that time forming a part of Geometry, Archimedes perfectly squared the Parabola, and he determined the relations of spheres, spheroids and conoids to cylinders and cones.
Hutton's Math. and Philos. Dictionary.

‡ Pythagoras first discovered that Lucifer and Hesperus were one and the same planet, viz. Venus. Before his time, they were thought to be two different ones.

‖ An eminent philosopher of the Pythagorean school, cotemporary with Plato. He referred the existence of all things to mathematical principles. He departed measurably from that school, in embracing the doctrine of Timæus, which inculcated the belief of two independent principles in nature, God and matter.

tona, and Nicetas of Syracuse, by their discovery of the diurnal and annual revolutions of the earth. It received additional improvements till the time of Ptolemy of Alexandria, who gave to the world, a system of his own. This prevailed till the time of Copernicus, a native of Thorn in Prussia, who revived the Pythagorean. Subsequent investigations have confirmed its truth. From a simple beginning it has grown into a vast and splendid science; and it is questionable, whether if Pythagoras or Copernicus should appear, they would know their own system, since the additions made to it by Gallileo, Kepler, Bradley, Herschel, and many others.

If the founder and reviver of the true aystem suffered during their lives from the persecution of ignorance, it would seem that the former is not allowed by all at this day, his just glory, while the reputation of the latter sustains its original brightness. Some, among the moderns have asserted, that Pythagoras had some confused notions of the motions of the planets, and that his mystical conduct as a teacher is sufficient to stamp him as an impostor. But while Brucker in his History of Philosophy, and Playfair in his Dissertation on Mathematical and Physical Science, attribute the sole discovery of the true theory of the earth, to Copernicus, and deny to the Samian sage, any correct knowledge in relation to it, the testimonies of many of the ancient philosophers* upon this subject, and the almost unanimous belief of the moderns from the time of Copernicus to Herschell, ought to be considered decisive on this point. We say Copernicus, because he himself admits in his address to Paul third, that he derived his first hint of the earth's motion from Nicetas, a follower of Pythagoras. This receives additional force, when it is recollected, that Rhæticus, a cotemporary of the Prussian astronomer, states in his commentary, that the observation of the Orbit of Mars, and the very great difference between his apparent diameters, led Copernicus to embrace the system of Pythagoras,—and what is a little remarkable, it was the same planet, that led Kepler† to the discovery of one of the most important facts connected with our system.

The notions which were entertained by many of the ancient philosophers,—at least those of the Italian school—and their mode of explaining them, so far as they were concerned with the phenomena of nature and the system of the universe, have afforded to the moderns much room for speculation upon the scantiness of their knowledge of physical science. It is taken for granted very

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* Among others, Aristotle, Plutarch, Diogenes Laertius, Plato, and Pliny.

† Rheinold, who lived at the time of Copernicus, taught that the orbit of Mercury was elliptical, and in his theory of the moon, he made her epicycle to revolve on an elliptic orbit, thereby partially anticipating the great discovery of Kepler

generally, that we know how far precisely they carried unitedly their observations, their experiments and calculations. No doubt seems to exist, that, because some of their views—fictions if you choose to call them so—have, in recent times, given rise to the most fanciful speculations about nature, they were very ignorant, and that their method of interpreting her operations, as Lord Bacon calls it, was entirely hypothetical and baseless. Among the several instances which are brought forward to show the effect which the ancient speculations, when literally taken, have produced upon men's minds, is that of the celebrated Kepler. "The mysterious theories of the Pythagoreans," says Dugald Stewart,* "which professed to find in the mathematical properties of figures and numbers, an explanation of the system of the universe, seem to have made a strong impression upon his mind, and led him into gross inconsistencies:" and hence he would have it inferred from this case, as it has been with most writers, that, because some among the moderns have originated out of the fragments of ancient writings, false theories, the philosophers of old must have been in error. So too the junior Herschell. "It is," he observes, "to be deeply regretted, that the Pythagoreans should have added to their sublime conceptions of the universe, fanciful speculations upon numbers, harmony, and the dimensions of the celestial orbs. One of these has given rise to the celebrated notion of the music of the spheres; and it would appear that Pythagoras fancied he perceived an analogy between the distances of the planets and the divisions of an octave in music." But, may we not reply to these sentiments in the language of the same Herschell, that "unfortunately we know not much of the arguments by which the doctrines of Pythagoras were supported in Greece; though we possess in sufficient detail the nugatory reasons urged against them by Aristotle, and in later times, by Ptolemy."

If, while these views are entertained by some, we are to place any reliance upon those of men of distinguished eminence in science, we have some reason, at least, to believe that the moderns have only been extending the knowledge of the ancients in relation to some of the laws by which the planetary system is governed. We refer to the additional facts, that some of the ancient philosophers were of opinion, that the celestial bodies gravitate towards one another, that they were retained in their orbits by the force of gravity, and that this energy acted according to the law of the inverse ratio of the squares of their distances. Whether we are right or wrong, it must be confessed, that the following remarks would seem to justify that inference; and if they do not serve to instruct, they may at least gratify curiosity.

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* Philosophy of Mind.

In the infancy of astronomy, a belief was universally entertained by the Greek philosophers, that the planets were dense, heavy bodies and gravitated towards each other. The saying of Anaxagoras, of Euripedes, Democritus, Metrodorus, and Diogenes, that the sun and stars were masses of red-hot iron, or stones, meant nothing more than that they were dense, and fixed bodies, capable of bearing a very intense heat. These opinions were derived from Thales through Anaximander and Anaximenes, and were embraced by the Pythagoreans, who, as Plutarch states, taught, besides their doctrine of the sphere, that each star was a world in the infinite ethereal space, containing earth, air and ether, and that the moon is not only of like nature with our globe, but is inhabited by animals of a larger size, and filled with plants much more beautiful than ours.

In relation to gravity, the ancients were of opinion, that it was not occasioned by virtue of any particular point within the earth or of the centre,* to which all bodies tended, but that it was owing to the whole mass of matter contained in the globe itself, and that the gravitation of bodies towards the earth resulted from the gravitation of all particles towards each single part. They believed there was a gravity towards the sun and moon, acting in the same manner as it does towards the earth, and that each planet, like a stone whirled in a sling, was kept in its orbit by the same principle, and for the same reason revolving always about us. For, Plutarch in his work De Facie in Orbe Lunæ, remarks, that the moon is helped and preserved from falling down, by her very motion, and that impetuosity of her revolution; as stones and other weighty bodies, put in slings and swung round, are kept from dropping out by the swiftness of their motiou, and their being moved circularly.†

From certain passages in Diogenes Laertius, concerning Plato, which also are alluded to in his Timæus, Gallileo was of opinion, that Plato‡ supposed the mundane bodies when they were first

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* Sir Isaac Newton has proved, that a particle of matter, placed without the surface of a hollow sphere, is attracted by it in the same manner as if the mass of the hollow sphere, or the whole matter it contains, were collected in its centre. The same is, therefore, true of a solid sphere, which may be supposed to consist of an infinite number of concentric hollow spheres. This, however, it may be added, is not the case with a spheroid. The attraction of the earth, (in consequence of not being a true sphere,) on bodies at its surface in that latitude the square of whose sine is $\frac{1}{4}$, is the same as if it were a sphere.

Somerville's Connection of the Physical Sciences.

† Gregory's Physical and Geometrical Astronomy, vol. 1.

‡Diogenes Laertius remarks, that the planets at first were moved in a confused and irregular manner, but when they were duly adjusted and rightly settled, then the world was established by God in just and proper proportion: and Plato, in his Timæus, says that the Supreme Intelligence gave the earth a motion altogether agreeable to its nature as a body, (that is a direct motion) and then adds, that, therefore, he afterwards made it continue its course in a circle.

formed, were moved with a rectilinear motion, but after they had arrived at some determined place, they began to revolve (by gravity) by degrees in a curve, the rectilinear motion being changed into a curvilinear.* It is from the doctrine of gravity, that Lucretius, a disciple of the Atomic school, labors to prove that the universe has no centre or lowest place, but that there is an infinity of worlds like ours in the immense space.†

From the ancient writings we may then conclude, that the philosophers of old believed that bodies gravitate towards one another.‡ From the same sources, it would appear, that they were acquainted with the law and proportion which gravity observes according to the different masses and distances. Lucretius asserts, that it is proportional to the quantity of matter in the body.

> Besides, why have not bodies equal weight
> With those, whose figure is but just as great?‖

He also affirms, that what we call light bodies,§ do not ascend of their own accord, but by the action of a force underneath them, impelling them upwards, just as a piece of wood is in water; and further adds, that all bodies, as well heavy as light, descend *in vacuo*, with an equal celerity,¶ a truth easily verified by the air pump. In book 2d, verse 288, he says,

> Therefore through *void*, *unequal* weights must be
> *Like swift* in motion, all of like degree.

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* In the Principia it is demonstrated that if any body revolve round another in a circle, the revolving body must be projected with a velocity equal to that which it would have acquired in falling through half the radius of the circle towards the attracting body. But if one body revolve round another so as to vary its distance from the centre of motion, the projectile and centripetal forces must be variable, and the path or trajectory of the revolving body will differ from a circle.

Newton has proved that a body projected in space will move in a conic section, if it be attracted by a force directed toward[illegible]ixed point, and having an intensity inversely as the square of the distance, but that any deviation from that law will cause it to move in a curve of a different nature. The planets are considered as moving in elliptical orbits, and these would naturally be true ellipses, were they only attracted by the bodies respectively, about which they revolve; but in consequence of the attractions or disturbing influences of the other planets, their orbits are never truly elliptical. However, to simplify their calculations, astronomers may suppose that a planet remains in an ellipsis, but that this ellipsis is movable about the centre of force.

Newton's Principia.—Cavallo's Philos.

† De Rerum Natura, Lib. 1, v. 986.

‡ Gregory's Phys. and Geomet. Astron. v. 1.

‖ Lucretius, Lib. 1. v. 415.

§ Lucretius, Lib. 2. v. 178.

¶ Aristotle, whose opinions triumphed over the sublime conceptions of the Pythagoreans, and were for nearly eighteen hundred years regarded as indisputable, maintained that the velocities of falling bodies were directly proportional to their quantities of matter; thus, if two bodies were let fall together from the same altitude, one of twelve pounds and the other of one, the former would descend twelve times as fast as the latter; or, their relative velocities would be in the ratio

The law, that gravity decreases inversely, as the square of the distance, seems to have been known at least to Pythagoras.* This would appear to be what he and his followers meant by the Harmony of the Spheres. For, they feigned Apollo playing upon a harp of seven strings, and this according to Pliny, Macrobius and Censorinus, was symbolical of the sun and the seven planets, and they thought that by his attractive force,† he acted upon those bodies in the harmonical ratio of their distances. For, the forces by which equal tensions act upon strings of different lengths, being equal in other respects, are reciprocally as the squares of the lengths of the strings.‡

It is related by Macrobius, that, as Pythagoras was passing a black-smith's shop, he observed, that the sounds made by the hammers were more acute or grave, in proportion to the weights of the hammers. He was from this circumstance led to try an experiment, of stretching strings and fastening various weights to them, and here also he found that the sounds were proportional to their weights. He was hence led to investigate the numbers, according to which consonant sounds were generated. Whether this statement is true or not, it is certain that Pythagoras found out the true ratio between the sounds of strings and the weights fastened to them; and afterwards applied the proportion he had thus found by experiments, to the heavens, and thence learned the Harmony of the Spheres. By comparing these weights with the

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of 12 to 1. This opinion, besides several others equally erroneous, was overturned by the discoveries of Gallileo, towards the end of the sixteenth century. In respect to falling bodies, he was the first in modern times to prove, that under the influence of gravitation, they would fall through spaces proportional to the squares of the times of descent.

* Gregory's Physical and Geometrical Astronomy, vol. 1. p. 10.

† Of the activity of the forces that are operating in nature, we may form some notion, if such extraordinary things are conceivable at all, by La Places description of the attractive power. "I have ascertained," says he, "that between the heavenly bodies, all attractions are transmitted with a *velocity* which, if it be not infinite, *surpasses several thousand times the velocity of light;* and we know that the light of the moon reaches the earth in less than two seconds."

La Place's System of the World, vol. 2. p. 150.

The annotator on La Place so amplifies this idea as to detail an Algebraic demonstration, "that, the gravific fluid passes over *one million* of the earth's semidiameters in a *minute* of time. Its velocity is eight million times greater than light.—Vol. 2. p. 493.

These may be mathematical truths, but they are beyond the reach of human conception.

‡ Gregory's Phys. and Geom. Astron. v. 1. p. 10.

When two strings of equal diameter are equally stretched, the relative numbers of their vibrations, and of the consequent tones they yield, will be in the inverse ratio of their lengths. When strings have the same weight and tension, the numbers of their vibrations and respective tones, will be in the inverse ratio of their diameters. When strings have the same diameter and the same length, the numbers of their vibrations and relative tones will be in the direct ratio of the square roots of the weights by which they are stretched.

Cavallo's Nat. Phil. vol. 1.

weights of the planets, and the intervals of the tones produced by the weights, with the interval of the spheres; and lastly, the lengths of the strings with the distances of the planets from the centre of the orbs, he understood, as it were, by the Harmony of the Spheres, that the gravity of the planets towards the sun, according to whose measure the planets move, was reciprocally as the squares of their distances from the sun.*

In referring to the opinions entertained by Pythagoras and his followers, we ought not, perhaps, to pass over that of Empedocles, who lived near five hundred years before Christ. He maintained that the world had been reduced to its present form by the opposite action of two forces, that equalized each other, which were symbolically represented by Love and Discord: the former significant of the power of attraction; the latter, a law that obliged the parts of matter to separate, somewhat similar with that which Newton has supposed in explaining the properties of the ether, and the transmission of light. Under the influence of Love, the world would have been an unvariegated mass; under that of Discord, the parts of matter would have been scattered through infinite space, forming a fluid chaos in perpetual motion. Stripped of mathematical calculations, our present ideas amount at last on this point, to those of Empedocles.

It may naturally be asked, what necessity existed, that the ancient philosophers should express themselves upon such points as are under consideration, so enigmatically, as it must be allowed they did. A reason may be assigned in a very few words. Theophrastus, as quoted by Plutarch and others, says, they went in the expression of their sentiments on this subject, *as far as they dared.* The fate of Anaxagoras was a warning to philosophers, and hence to secure their own persons from the bigoted fury of the populace, they were obliged to express their opinions under the seal of mystery. The persecution and death of Socrates were before Plato, and it was with fear and trembling, that he even intimated the motion of the earth on its axis. The Athenians had established it as an article of their theological belief, that the earth was immovably fixed in the centre of the system. It was difficult indeed to harmonize this doctrine with astronomical observations; but it would not have been less safe to have directly attacked it at Athens, the only city in Greece, at that time, in which the study of astronomy was in great repute. Great efforts were made to find out some means by which celestial appearances might be made to agree with the popular belief of the Athenians. Hence the mystical mode of explanation, and also, as Eudemus, a cotem-

* Gregory's Physical and Geometrical Astronomy, v. 1. p. 12.

porary of Aristotle, states, that Plato* was led to search for the discovery of a method for this purpose, which he proposed to the Geometricians in the following problem, the object of which, according to Ptolemy, was not to assign the cause of the celestial motions, but only an hypothesis, that might render these appearances subject to calculations;—viz: "To explain the different motions of the planets by motions that are circular, regular, and concentric to the earth."—The Greek astronomers, indeed, seemed sensible of the physical absurdities attending their hypotheses, but they were under a necessity of making use of them. The same remarks are applicable to the Pythagoreans in Italy. Aristarchus was accused by Cleanthes, a follower of Zeno, for having, as Plutarch remarks, removed the earth from the centre of the universe, and made it turn round its axis.† Nor, indeed, ought we to be sur-

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* In some astronomical work, we lately saw it remarked, that Plato regretted in his old age, that he had placed the earth in the centre of the system. Plato, like the other philosophers of old, had two sets of doctrines, one for his disciples, another for the populace.

Turner, in his Sacred History, says that "Plato did not dare to express what he knew. It was indeed the highest crime at Athens, at that time, to do so. Their laws and policy and domestic habits were all founded on Paganism, as well as their religion." And yet, though Pythagoras was in the same circumstances, and compelled to be cautiously wise, Turner regards him either as a very deluded man, or great impostor, ascribing to Philolaus the merit of the opinion, that the sun was the centre of the system, and allowing to the Samian philosopher, the doubtful credit of having gathered a few fragments of patriarchal tradition only.
Sac. Hist. v. 1.

† It was a great oversight in the theologians of the papal church to resist the admission of the Copernican system, that the earth moved round its axis, and to prefer to cling to the Ptolemaic theory, of the sun actually circling round us, as it appears to do. The doctrine of Ptolemy is incompatible with the Mosaic account, of a day beginning before the Sun, because upon that theory the sun is essentially necessary to make the period of time which constitutes a day. But on the Copernican system, the earth does this without the sun, as its revolving motion round its own centre, which forms our day, does not require the solar luminary.
Turner's Sacred History, Letter 1, vol. 1, p. 27.

To show the absurdity of the supposition, let us allow that the sun revolves round the earth in 24 hours, and that the earth has no diurnal motion. Now, it is a known principle in the laws of motion, that if any body revolve around another as its centre, it is necessary that the central body be always in the plane in which the revolving body moves, whatever curve it describes; and therefore, if the sun move round the earth in a day, its diurnal path must always describe a circle which will divide the earth into two equal hemispheres. But this never happens but on the day of the equinoxes, when the sun rises exactly in the east, and sets exactly in the west; for, in our summer, the sun rises to the north of the east, and sets to the north of the west; and in the winter, it rises to the south of the east, and sets to the south of the west; therefore, its diurnal path divides the Globe into two unequal parts; and consequently the sun does not move round the earth.—This is only one among many arguments against the hypothesis.
Emerson's Astron.—Keith.

Its annual motion may be deduced from the following law of centripetal force: that if two bodies revolve about each other, they revolve round their common centre of gravity; and this centre in position is always inversely as the weights of the bodies.

prised at this, when we look into the nature of the Stoical doctrine, which resolved all things into an absolute fatalism, and a kind of materialism, a system subsequently revived and adopted by Spinoza. But we have less reason to be surprised at the treatment of Aristarchus, than that which the illustrious Galileo* received at the hands of those, who as a *mass*, were as ignorant of the true astronomical system as the Athenians in their earlier ages, and which proves, among other instances, that ignorance is at all times and in all ages, persecuting in its nature, and that truth is slow of progress.

The law of gravitation of which we have been speaking, like the Pythagorean theory of the earth, seems to have slumbered in quiet till the time of Copernicus, who appears in the Newtonian sense of the term, to have been the first in modern times to surmise it. "As for gravity," says he, "I consider it nothing more than a natural appetence which the Creator has impressed upon all the parts of matter, in order to their uniting or coalescing into a globular form, for their better preservation; and it is probable, that the same power is also inherent in the sun, and moon, and planets, that those bodies may certainly retain that round form in which we see them." Kepler, a man of transcendent genius, soon followed, and pronounced that light and heavy bodies were relative terms, and that, therefore, all matter was subjected to the power and law of gravitation; and he went so far as to conjecture, that this power decreases as the square of the distance of the body upon which it is exerted; but, unfortunately for his fame, he soon rejected this law, and adopted that of the direct ratio of the distance. But without this, his discoveries of the astronomical laws are sufficient to immortalize his name; and the three Keplerian laws, as they are called, viz:—that the motion of the planets are in elliptical orbits;—that the radius vector describes equal areas in equal times;—and that the squares of the periodic times, of any two planets, are to one another as the cubes of their mean distances from the sun—are ever-during monuments of the high and capacious powers of his mind.

But before the time of Newton, none seem to have had clearer ideas of the doctrine of universal gravitation, or, approached so near to the application of it to the laws of nature, as Dr. Hooke. This celebrated man seems to have embraced it in nearly the whole of its generality. The theory on which the system of the world is expounded by Hooke, is grounded on the three following principles, viz. 1st. That all the celestial bodies have not

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* Galileo revived the study of Geometry in Italy, and excelled in it, and was the first that applied it, together with experiment, to natural philosophy.

Hume's Hist. England. James 1.

only an attraction or gravitation towards their proper centres, but that they mutually attract each other within the sphere of their activity. 2d. That all bodies which have a simple and direct motion, continue to move in a direct line, if some force which operates without ceasing, does not constrain them to describe a circle, an ellipse, or some other more complicated figure. 3d. That attraction is so much the more powerful, as the attracting bodies are nearer to each other.*

Passing over Tycho Brahe, Kepler and others, we come to Sir Isaac Newton, whose genius concentrated the scattered efforts of the many powerful minds that had preceded him, or were his cotemporaries, and which had thrown their light upon the great laws of the material universe. "Newton, indeed, was but the leader of the mighty phalanx—the director of their combined energies—the general who won the victory, and therefore wears its laurels.†

The great discovery, says Sir David Brewster,‡ which characterises the labors of Newton, is that of the principle of universal gravitation, as deduced from the motion of the moon, and from the three great facts or laws discovered by Kepler. This principle is, that every particle of matter is attracted by, or gravitates to, every other particle of matter, with a force inversely proportional to the squares of the distances. From the first law of Kepler, the proportionality of the areas to the times of their description, Newton inferred that the force which kept the planet in its orbit was always directed to the sun; and from the second law of Kepler, that every planet moves in an ellipse with the sun in one of the foci, he drew the inference, that the force by which the planet moves round that focus varies inversely as the square of the distance from the focus. As this law was true in the motion of satellites round their primary planets, Newton deduced the equality of gravity in all the heavenly bodies towards the sun, upon the supposition, that they are equally distant from the centre; and in the case of terrestrial bodies, he succeeded in verifying this truth by numerous and accurate experiments. By taking a more general view of the subject, he established the universal law of gravitation, and his genius shines with no less lustre in the patience and sagacity with which he traced the consequences of this fertile principle.‖ Thus that which had been matter of uncertainty and

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*Hutton's Math. Dict.

† Brewster's Life of Newton.

‡ Brewster's Life of Newton.

‖ At the time that Newton published this great discovery, Sir Christopher Wren, Dr. Halley and Dr. Hooke were endeavoring to demonstrate from the law of Kepler's periods and distances, all the laws of the celestial motions. Dr. Hooke laid claim to a share in this discovery. Hooke said that Newton had the notion from

speculation for many centuries, became an established law,—a key, as it were, by which the doors of the great temple of nature have been unlocked, and its arcana exposed to the view of mortals.*

Great as the discoveries of Newton are, yet we believe, that the labors of Galileo, Tycho Brahe, Kepler, Huygens, Borelli,† and some others, are not properly appreciated. The great mass of people, with the exception of comparatively a few mathematicians, are of the belief, that Sir Isaac was led to the development of the laws which govern the universe, by the force of his own unaided genius. This, however, is not the case. Had it not been for the patient investigation of vast minds, before and during his time, we should indeed probably have heard of him, but the glory which now rests upon his name, would have been left to settle upon that of some other individual. The attentive examination of Newton's discoveries and those of other philosophers, will plainly show, that he seized facts ready to his hand, combined them with transcendent skill, and deduced from them, their certain consequences with mathematical precision. If, for example, "the mean distances either of the planets or their satellites, be compared with the duration of their siderial revolutions, it will be easy to trace the beautiful relation discovered by Kepler; namely, that, while several bodies turn about the same point, the squares of the periodic times are respectively as the cubes of their mean distances from that point; and if we combine this law with the theory of Huygens, viz. that when the squares of the periodic times of several bodies circulating about the same point, are respectively as the cubes of the distances from that point, the central forces which animate them, are in the inverse ratio of the squares of the same distances;—it will be easy to discover the law of gravitation, and as it were, to unveil the mechanism of the planetary system."‡

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him; but owned that the demonstration of the curves generated, was wholly Newton's. To compromise the dispute, Newton added a scholium, in which Wren, Hooke and Halley are acknowledged to have, independently of each other, deduced the law of gravity from the second law of Kepler. This scholium was added to Prop. 4th Book, 1. corol. 6. Brewster's Life of Newton.

* Sir Isaac Newton's Principia and the Celestial Mechanics of La Place sufficiently show the strict geometric science of the sublimest kind, on which all the laws and phenomena of our system have been constructed. There are several other illustrious mathematicians, whose works will furnish supplementary illustrations of the same magnificent truth. Turner's Sac. Hist. vol. 1.

† Borelli, an Italian philosopher, published a work in 1666 on Jupiter's satellites, in which he maintains, that all the planets move round the sun as their centre, according to a general law, in the same manner as the moon does about the earth. By virtue of the sun, the planets are so united to it, that they cannot recede from their centre of action.

‡ Part 3d of this article will appear in the next No.

ON THE ORIGIN AND PROGRESS OF WRITTEN LANGUAGE.

A spoken language, by addressing itself to the ear, is necessarily confined within certain limits, can be heard only at a certain distance, and depends for its preservation, entirely upon the memory. Many circumstances, too, must have occurred even in the early progress of society, when languages were forming, to require a system of signs not only more permanent than spoken words, but such as might be used in facilitating intercourse between absent friends, and in conveying intelligence from one place to another. The desire of communication with persons at a distance, and of preserving the remembrance of distinguished characters and events, led, in the course of time, to the invention of symbols, which, addressing the mind through the eye instead of the ear, might be used for transmitting a knowledge of facts to the remotest corners of the earth, and for preserving the thoughts of those who had been dead thousands of years.

The art of embodying language in visible signs, must have been considerably posterior to that which respects the use of mere vocal sounds; and, accordingly, we have accounts of many nations who are ignorant of the art of writing; but we know of none who are not in the possession of a spoken language. The following are probably some of the steps which were taken, in laying the foundation of this wonderful improvement.

The first, and most obvious device for representing a visible object, is to draw an outline of a whole figure; and the next step, in the progress, is an abridgment of this outline, by fixing on some characteristic, and leaving out the rest—the head of a man, for example, instead of the entire body. When, again, it became necessary to represent invisible objects, the intention of the rude artist would most probably be fulfilled by using emblems, founded on some analogy, or allusion, to objects of sense; and the minuter parts of the information, the particular circumstances attending the event, or fact, concerning which intelligence was to be communicated, would be expressed by multiplied variations or additions to the original draught, These views as to the origin of writing, are, in some measure, confirmed by authentic records. But the imperfection and obscurity of the hieroglyphic mode of writing, which must have necessarily increased with the progress of knowledge, and the utter impossibility of ever accommodating it to the manifold purposes of an extensive communication, suggested, it is probable, to some happy genius, that most valuable improve-

ment in the art of *embodying thought in visible signs*—the method of writing by ALPHABETICAL NOTATION. This astonishing invention, it is well known, proceeds upon an analysis of the various sounds employed in human speech, and upon a discrimination of the principal elements into which they are reduced, by means of distinct visible characters. As soon as the attention was directed to this view of the subject, it would naturally enough occur to the mind of an ingenious man, that, as the same sounds are frequently repeated in vocal enunciation, the whole elementary sounds of a language, even when arrived at considerable perfection, might be represented by a limited number of marks or letters: and, in this way, was constructed that system of characters, denoting at once the simple sounds of spoken language, and the component parts of written language, to which has been given the name of *Alphabet*. As the principal elementary sounds depend almost entirely upon the conformation of the organs of speech, this discovery could be easily adapted to all the tongues and modes of utterance in use among men; and, as the same alphabet suits the language of ancient Rome and those of modern Europe, so might there be the same uniformity among the Greeks and all the nations of the East.

It is extremely probable, that mankind owe this *noble invention* to the genius or industry of one individual; and yet no memorial of the inventor is to be found; no account of the country in which he lived; nor even of the particular epoch in the history of the world in which he accomplished this great achievement. On no occasion, is the philosopher more disposed to lament the deficiency of ancient history, and the very imperfect notices which are furnished by tradition, than when he reviews the progress of this discovery and invention, the honor of which is no-where appropriated.

The principles upon which philosophic grammarians have attempted to discriminate and classify the component parts of human speech, whether written or spoken, have been treated of in the previous numbers.

As the intellectual faculties exhibit in every tribe of human beings, the same general character, and perform the same operations according to their several degrees of improvement or perfection; and, as the people of every climate have nearly the same feelings to express, and similar objects to designate, it is to be expected, that a common basis, and a great similarity of structure, should be found in all languages. They all necessarily agree in substance; differing only in form, and in what may be called their *minor accidents*. Thus, every person, acquainted with more than one language, must have perceived, that, in all, there are the same classes of signs, and the same relative functions among the words which compose them.

An illustration of the origin and progress of artificial signs, may be obtained by watching the beginning and progress of them in children, when all their communication is carried on by natural language. An observer may perceive how the association begins —and how it is strengthened in their mind—the steps by which they pass from *natural* to *artificial* signs—from signs that first denote sensible objects, and are afterwards transferred by analogy to those that are intellectual—and, the principles which lead them to join words together in sentences, to express a complete and continued thought. It must be allowed, that in this way, mental experiments may be regularly instituted. Trials may be made to discover the natural workings of the mind, in the efforts which it makes to communicate by external signs. Thus instructed, the learner will raise his thoughts higher and higher in the progress of language, and discover a constant relation between the progress of reason and language.

Language properly signifies the expression or enunciation of human thoughts and sentiments, by means of articulate sounds of the human voice. Man of all animals, only is possessed of speech. Mere sound is, indeed, the sign of what is pleasurable or painful, and it is, for that reason, common to most other animals; for, in this manner, do they signify their feelings to each other. But speech, indicates what is expedient or hurtful, and as a natural consequence, what is just or unjust. It is, therefore, given to man; for a sense of good and evil is peculiar to man alone.

The most intelligent of the brute creation frequently astonish us by actions, which can proceed only from powers of intellect, similar to our own: the capacity of speech, then, is the criterion of distinction between man and the brute creation. Reason, the capital faculty and characteristic of man, would, without this extensive power of communication, have remained in a state of inactivity, its energies unexcited, and its faculties torpid.

In the early ages, there is every reason to suppose, that the difference of language in Europe, Asia, and Africa, was no more than a difference of dialects; and that the people of Greece, of Phœnicia, and of Egypt, mutually understood each other. The *oriental* origin of the Latin and Greek, is now generally acknowledged; and to these the Teutonic dialects have an affinity; the Arabic, the Chaldee, the Syriac, and the Ethiopic still bear the most striking resemblance to the *Hebrew*. In the Welsh, are many words analogous to it: the Celtic, also, has derived much from this and other eastern languages. The *Hebrew*, then, if we judge from these remarkable facts, from the mode of its derivation from its radicals, or from the simplicity of its structure, must, undoubtedly, be considered as the primitive or parent language.

An eminent linguist of the present day thinks it very likely, that the original language was composed of *monosyllables*, that

each had a distinct ideal meaning, and only one meaning; as different acceptations of the word would undoubtedly arise either from compounding terms, or when there were but few words in the language, using them by a different mode of pronunciation, to express a variety of things. Where this simple monosyllabic language prevailed, (and it must have prevailed in the first ages of the world,) men would necessarily have *simple ideas*, and a corresponding *simplicity of manners*. The Chinese language is exactly such as this; and the *Hebrew*, if stripped of its vowel points, and its *prefixes*, *suffixes*, and *postfixes*, separated from their combinations, so that they might stand by themselves, would nearly answer to this character, even in its present state.

Oral language is of every day's use, and indispensable to man as a social being. By its means, the mind is trained to order and thinking. It is peculiarly adapted to the business of education. But, however valuable oral language may be, we find that nations who have advanced no farther than the use of *audible* signs of ideas, have never made any great progress in civilization. Hence the art of representing our thoughts by *visible signs*, or more properly by the ALPHABETIC NOTATION may indeed be called the *greatest and most powerful discovery of human ingenuity*. The art of writing has this great advantage over oral language, that it is not confined by time nor space. By its instrumentality, the experience and wisdom of past ages can be rendered subservient to the improvement of all succeeding time. Spoken language serves the present purpose and present time, and *perishes in using;* but written language gives to the airy beings of our minds, not only *a name, but a local habitation.*

W.

CULTURE OF THE HEART.

Every moral and intelligent teacher has an opportunity daily of impressing the minds of his pupils with a sense of the Goodness, Omnipresence, and Agency of God, every time he is teaching a lesson which is descriptive of the works of nature. Morality can never be effectually taught to the young by vague exhortations, and general rules and maxims,—more especially when such instructions are not thoroughly understood. If we wish to impress the youthful mind with the odiousness of vice, and excellence of vir-

tue, we must fix upon *particular actions*, apply to them moral rules and precepts, and illustrate, by familiar examples, their nature and tendency. Every teacher has opportunities of directing the attention of his pupils to certain actions, both good and bad, which appear in their general conduct, and the judicious remarks he makes on the temper and dispositions manifested by particular individuals, will make a more definite and lasting impression upon the minds of the young, than can be produced by the mere reading or repetition of moral maxims or general rules. Every child who has been regularly taught to understand every sentence he reads, and to exercise his judgment upon it, will undoubtedly be better prepared than others for forming a judgment of the propriety or impropriety of certain moral actions, when they are explained to him with simplicity and clearness. In a more advanced stage of education, however, moral lessons, accompanied by examples of virtues and vices, may with great propriety be introduced.

When truth is simplified by familiar oral illustrations taken from objects with which children are acquainted, and confirmed by appeals to their senses, they imbibe it with avidity, and frequently retain the impressions thus made to the latest period of their existence. The celebrated Fenelon has observed, that "before they are thought capable of receiving any instruction, or the least pains is taken with them, they learn a language. Many children at four years of age can speak their mother tongue, though not with the same accuracy or grammatical precision, yet with greater readiness and fulness than most scholars do a foreign language after the study of a whole life." This circumstance certainly indicates no small degree of intellectual energy and acumen. And to this we may add, that they discover their intellectual powers by connecting the *idea* with the *sign* of it, and acquire many notions of good and evil, right and wrong, in that early period of life. Such are the powers of discrimination, that they can distinguish the characters and dispositions of those with whom they associate, and frequently know the tempers and weaknesses of their parents, much better than the parents know theirs, and are dexterous enough to avail themselves of that knowledge in order to obtain their desires and gratify their humors.

In most of our treatises on education, there appear to be some glaring defects. In the first place, the *moral* tuition of youthful minds, and the grand principles of religion which ought to direct their views and conduct, are either entirely overlooked, or treated of in so vague and general a manner, as to induce a belief that they are considered as matters of inferior moment; and, in the business of teaching, and superintendence of the young, the moral precepts of Christianity are seldom made to bear, with force, upon every malignant affection that manifests itself, and minor delin-

quency that appears in their conduct—or to direct the benevolent affections how to operate in every given circumstance, and in all their intercourses and associations. In the next place, the idea that man is a being destined to an immortal existence, is almost, if not altogether overlooked. Volumes have been written on the best modes of training men for the profession of a soldier, of a merchant, of a physician, of a lawyer, of a clergyman, and of a statesman; but we know of no human treatise on this subject, which, in connection with other subordinate aims, has for its grand object to develop that train of instruction which is most appropriate for man considered as a candidate for immortality.

This is the more unaccountable, since, in the works alluded to, the eternal destiny of human beings is not called in question, and is sometimes spoken of as a mere general position which cannot be denied—yet the means of instruction requisite to guide them in safety to their final destination, and to prepare them for the employments of their everlasting abode, are either overlooked, or referred to in general terms, as if they were unworthy of particular considerations. To admit the doctrine of the immortality of the human soul, and yet leave out the consideration of it, in a system of mental instruction, is both impious and preposterous, and inconsistent with the principles on which we generally act in all other cases, which require, that affairs of the greatest moment should occupy our chief attention. If man is only a transitory inhabitant of this lower world, if he is journeying to another and more important scene of action and enjoyment, if his abode in his higher scene is to be permanent and eternal, and if the course of instruction through which he now passes has an important bearing on his happiness in that state, and his preparation for its enjoyments—every system of education must be glaringly defective which either overlooks, or throws into the shade, the immortal destination of human beings.

If these sentiments be admitted as just, the education of the young must be a subject of the highest importance—and there cannot be an object more interesting to Science, and Religion, and to general Christian society, than the forming of those arrangements, and the establishing of those institutions, which are calculated to train the minds of all ranks to knowledge and moral rectitude, and to guide their steps in the path which leads to a blessed immortality. In this process there is no period of human life that ought to be overlooked—we must begin the work of instruction when the first dawning of reason begins to appear, and continue the process throughout all the succeeding periods of mortal existence, till the spirit takes its flight to the world unknown.

E. K. P*******N.

THE NATURAL SCIENCES.*

We shall here offer a few reasons for considering the natural sciences worthy of a still higher rank than they now hold, in every complete system of education. It has always appeared to us a fallacious opinion, that these sciences must yield in importance to intellectual philosophy, the mathematics, logic, etc., if we take for our standard the proportion in which they respectively exercise the higher faculties of the mind.

In the first place, we object to the standard. The mere cultivation of our reasoning powers contributes but little to the general improvement or happiness of mankind, and constitutes a small part of our duty to ourselves and others. The associations which so invariably give a direction of good or ill to the exercise of these powers, should never be disregarded. Our passions are to be regulated—our feelings refined—our moral perceptions quickened, and rendered absolute and superior over the whole man. Without this, the highest intellectual strength, original or acquired, is the most injurious and unlovely attribute of which our nature is susceptible—hateful just in proportion to its vigor. It is the blind power of the Cyclop, vast and irresistible in his might, capable of raising mountains in the hollow of his hand, but restrained by no principle from dashing them, with the malignity of a destroying angel, upon the fairest works of man's creation.

But we do not leave the point here. The natural sciences *do* furnish a most useful employment to the reasoning powers. They are removed from that spirit of rivalry and bitterness of envy, so often attendant upon the speculations of the learned; they lead to a nice observation of differences—a close inspection of slight resemblances—a caution in drawing conclusions—patience in investigation, and order and arrangement in all our habits of thought and action. These advantages can never be unimportant to rational and intelligent beings; and we know not from what other source results more conducive than these to the great interests of society, can well be derived. We do not speak of the gratification of that curiosity felt by the savage, to know something of the wonders constantly recurring around him. We allude to that higher wish to understand whatever is connected with our happiness, and so connected by a wise design of Providence, as to make that happiness dependent upon our own exertion—at once an in-

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* From the Journal of Education.

centive and reward to our labor. We speak of that laudable desire, so well expressed by Boccaccio, 'to learn the reasons of things and the causes of the same, *as becomes a gentleman.*' This effectually destroys the superstition which enchains the minds of the ignorant when they look upon the operations of Nature; this, too, places new worlds within the power of man, and while it affords him the means of gratifying his multiplied wants, causes him to feel more and more his dependence upon others, and secures to him the utmost possible benefit to be derived from the social nnion. And what can the largest philosophy offer more than generally to elevate the views and refine the character of all.

Such is the boundless range of subjects with which it is necessary for a well informed man at the present day to be acquainted, that particular attention should be directed to those only that yield, on the whole, most pleasure and profit to the individual, and at the same time enable him to be most useful to his fellow men. Yet wide and unlimited as are the boundaries of science, our studies are intimately connected with each other. 'Etenim omnes artes quæ ad humanitatem pertinent, habent quoddam commune vinculum, et quasi cognatione quadam inter se continentur.'* Not that there is any similarity between ethics, logic, the languages, etc., but they each and all possess their secret treasures to unfold to the inquirer; they are adapted to the mind in the different stages of its advancement, and dependant upon one another in regular gradation by the greater or less degree of application necessary to their complete mastery.

The sciences constitute a family beautifully united, with just enough of resemblance in the general outline to point out their connexion, yet infinitely diversified by individual peculiarities and characteristic differences. If the attention is once awakened to the attraction of any of them, it is awakened never to be fully satisfied. An endless thirst will be created, an intense and active curiosity excited, to become more intimately conversant with every member possessing marks, however remote, of a common origin. Nature, in her thousand forms and changes, but all of them forms of beauty and changes of loveliness, becomes the inexhaustible field of observation and study. The man whose taste has been thus formed and chastened, goes abroad into the world with a power of receiving new impressions from all around him. In realizing the expressive fable of Roman history, he finds the same communicative Egeria, still imparting in her solitary places those lessons of wisdom which she first taught to the founders of the mightiest empires of old. A familiar acquaintance with natural science has given him as it were a new sense. The same ob-

* Cicero's Oration for the poet Archias.

jects may indeed meet the eye of others—the same variety of hill and dale, of mountain and wild-wood—but their inquiries end where his begin. They may experience a sensation of delight—a momentary sensation, which cannot be again excited when the different arrangement and combinations of the scene have lost their power to please; but there are other beauties, less prominent but not less interesting, constantly unfolding themselves to him. Not an insect borne upon the slightest breeze of summer, not a leaf waving in the wind, not a pebble beneath his feet, without its appropriate lesson of instruction.

> "He finds
> Tongues in trees, books in the running brooks,
> Sermons in stones, and good in every thing."

Inanimate creation speaks a language more powerful than the voice of words. The minute and the vast proclaim one creating energy. The same Being who mingles the delicate tints in the rose-bud and the tulip, or spreads the light down on the butterfly's wing, retains the planets in their orbits, and takes up the isles as a very little thing.

Physical and natural sciences are, moreover, of peculiar utility, from the very manner in which they must be investigated. They can only be pursued with success by a patient examination of facts; their object is unalterable truth, to be derived from accurate deductions, and often repeated observations. The opinions of men derived from almost every other source, change with the fluctuations of time, and there is hardly a principle of our nature which may not be disputed, even on historic ground. The interests of men and of nations, which are determined by the application of experience to given circumstances, are, and must be regarded in different lights, as those circumstances vary. Every thing of speculation will become altered, as the relations among men, dependent upon the progress of intellect, are themselves altered. But in regard to the sciences of which we now speak, the case is widely different. The results of our investigation no time can alter; their application to the necessities of our condition will be the same, centuries hence, as at the present moment. To understand the writings of antiquity, we must go back and place ourselves in the very circumstances of the author we would consult. But nature ever speaks the same intelligible voice of instruction; we can read and understand the wide-spread volume, and imbibe the feelings of the most distant age—we can extend the perusal even further than did those sages of old, who taught wisdom while walking in the midst of beautiful and diversified scenery.

Not the least of the beneficial results to be derived from these studies, is found in the influence which they eminently possess, to

counteract the direction too often given to the higher faculties, by other pursuits. The contracting tendency of legal investigations, has been frequently noticed. Burke speaks of it in the most decided terms, alluding to a distinguished contemporary, in his speech upon American taxation. Very similar, too, was the opinion of Gibbon, in reference to the mathematics. The natural sciences, however, yield ideas abundantly proportionate to the increasing strength of all the intellectual powers. In the vast chain of being, whose extremities are beyond our reach, extending wherever the vital principle is found, in earth, in air, and ocean, there is a regular gradation from the imperfect discoveries of youth, to the sublimest attainments of maturity. The materials hence derived, are as yet almost unknown, and will receive no sensible diminution when every law regulating the various combinations of matter shall have been fully established. For even then, countless deductions are to be made from a complete knowledge of form, structures, habitudes, and uses of the infinite multitude of individuals, in the animal, mineral, and vegetable kingdoms. Still further, this constantly accumulating mass of information, is all to be brought to bear in a thousand different ways, upon the purposes of life. And should such a period ever arise, we might still recur hither to exercise our best feelings, and give truth and purity to our thoughts. This consideration is of much importance to the writer. Every scholar knows how much of the pleasure derived from reading Horace or Juvenal, and in fact any of the older poets, belongs to the commentaries and illustrations of the monks and churchmen. Some local peculiarity impedes our progress in every line, and is ever referring us to the notes for an explanation. Allusions to every thing artificial are thus generally unsafe. Independent of the fact that the habits and manners of nations are dissimilar, there will always be important differences, in this respect, in the same nation, at different times. Such allusions then serve to give a direction to thought, they circumscribe the mind of the writer, and render his productions as fluctuating in interest as the objects referred to;—they in fact subject them to the same stages of corruption, mutation, and decay. The writer thus prescribes the limits to his own fame; he raises his monument upon a restless quicksand, towards which the tide, irregular and slow, and imperceptible in its approach, is constantly moving the whole mass of its destroying waves.

We do not then urge the study of natural sciences, as affording a solace to disappointed ambition, or a resource in times of difficulty and trial. Nor are we offering inducements to an idle and vitiated curiosity. He who collects and arranges his *specimens* from the various kingdoms of nature, attracted by their beauty, or regularity of form and structure, is engaged in about as profitable and noble an employment as the busy child, when amusing himself

with his gilded and glittering toys. The taste of such a one suggests the complacent pedantry of Lord Herbert in the picture galleries of Florence; and you look upon his nice observance of order and system, his neat cabinet and accurate descriptions, only to be reminded of the humorous catalogue of Rabelais, or the antiquarian riches of Captain Grose.

It was no such trifling purpose as this that led the devoted followers of Linnæus to every part of the habitable globe. They did not dare the dangers of the trackless ocean, land upon every shore and island, from Greenland to South Africa, and from the Atlantic to the Pacific seas, influenced by such principles of action. Something more than mere enthusiasm, too, supported them amidst the changes of the elements,—exposed to the still more fearful vicissitudes of the untameable passions of every race of men. It was an irresistible thirst for knowledge—the knowledge of all that nature has not absolutely sealed up from our view. Unintimidated in their noble purpose, they cheerfully encountered death in its most terrific forms, and we take a mournful pleasure in seeking out their sepulchres in the most distant regions, and applying to them that splendid fiction of the Roman law, which rendered sacred and hallowed forever the resting places of the dead. Grateful for their high service in extending the dominions of science, we accord to them the same honor and triumph anciently given to those heroes who brought new nations within the boundaries of the Republic. We need not, like them, devote all our days to the subject, but we ought certainly to direct hither that spirit of determined and manly inquiry which leads us to leave no department unexplored, never resting satisfied till we have arrived at a general law or an ultimate fact. In so doing we cannot fail to derive a benefit equal, at least, to whatever can be obtained from any other source of information.

LETTERS ON EDUCATION.*

Notwithstanding the many erroneous ideas that prevail on the subject of Education among our Farmers, you find among them very just views in other respects. Their indifference to Educa-

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* We have received two letters on this subject from Montgomery county.—The present one is the second in order, the first being deferred to the next number, on account of its length.

tion arises in a great measure from the belief that it has a tendency to foster idleness and dissipation, and to disqualify men for *work.* They acknowledge the use of reading, writing, and keeping accounts, for they find daily use for these; but more than this they suppose to be an abuse of time. They do not consequently appreciate any higher qualifications in their teachers than such as are barely necessary to communicate the elements of these: and twelve or fifteen dollars a month they think an ample compensation for the services of a teacher in such capacity. And while these sentiments are firmly rooted in their minds, it will be in vain, that, with a view to the improvement of Education, the Legislature raise great sums, by taxation or otherwise, or provide the means for the education of more enlightened Teachers. Twelve or fifteen dollars a month is all that they will pay the teacher, while they continue in their present belief; and the only effect of increasing the school fund by taxation or otherwise, will be to diminish *voluntary and personal* contributions, and thus to lessen the little interest they take in Education, not to improve the compensation of the teacher, or to add a fresh stimulus to his industry. You ask, then, what is to be done? I must confess the question is difficult to be answered. It seems to me that the Legislature has already done enough in the way of *pecuniary* provision, perhaps too much: and perhaps it were better that the interest of this surplus revenue should not have been given at all, for the purposes of Education, unless to those districts where the inhabitants are willing to raise by their voluntary contributions, a sum equal to that which by the present law they are entitled to receive. The rural population are abundantly able to school their own children, and to do it well, without any such aid; and if such aid is to be afforded at all, it ought to be in the way of *premiums*, and to encourage a wise disbursement of their gains in fostering a spirit of moral improvement, and not as a *perfect* legal provision, or a *public charity.** Since there is so great a disposition to estimate

* On this topic I have found some very just remarks, established on a basis of facts, in "The Annual Report of the Superintendent of Common Schools in the State of New York," 1833. "It is not at all probable that the distribution of three hundred thousand dollars annually from the State treasury, (instead of the present sum of one hundred thousand dollars,) would essentially increase the wages, or elevate the character of the teachers of the district schools. The operations of a system of universal instruction, are necessarily conducted, and in a great measure controlled, by the inhabitants of the neighborhoods in which the schools are located. It is necessary to convince a majority of the taxable inhabitants of each district of the importance of paying higher wages and securing better teachers, before any essential improvements can be made in the character of the common schools. If the inhabitants of a district have made up their minds to pay only twelve dollars a month for a teacher, this fixes the standard; and they will pay him that sum, and no more, whether the money is furnished from the public fund, or from their own pockets; and *just so much as the public dividend is increased, to that extent will the contributions of individuals be diminished.*"

the value of every thing by what it *costs*, it is necessary and salutary that the Farmers should feel that education *costs* them something, and that which is at first disagreeable to them by requiring certain sacrifices, will at last be esteemed, and become an object of desirable attainment. What, then, is to be done? Is there no more money to be contributed? I should say it was unnecessary for the Legislature to make any farther contributions, unless in the way of county or district *premiums* to those who are disposed to help themselves. And there is an inherent disposition in men to help themselves, and in Education as in every thing else; but this disposition requires to be called out, and to be confirmed and strengthened by exercise. And, often, all that is needed to produce such a result, is an example. If a single Farmer in a settlement adopt any decided improvement in the management of his farm, and its effects are *visible*, it is well known how eagerly and rapidly his example is imitated all through the neighborhood. True, men are more alive to the advantages of *good* farming than of good teaching, but let any one district in a township or county adopt (and it often could be done by the influence of a single active director) some decided improvement in a mode of teaching, engage some zealous young man, to take upon him the management of the school, and show themselves deeply interested in his labors;—let them call upon him, for example, to hold an examination of his scholars, at certain times, and invite all the neighbors around to attend, and let it be provided that a popular address shall be delivered by some benevolent and sensible citizen (and such can always be had, glad to benefit his fellow creatures); let there be some little rural *eclat;* and let it be understood that the ladies might attend here to show their *finery*, and the young men to show their gallantry; and all to hear, and to see and to be seen, and at all events, that the excitement should not be less than that of a church or a market, or even a small camp-meeting. The country people are passionately fond of *meetings*, and will have them and find them. Why might not this declared propensity of their character be enlisted on the side of Education, and the occasion so used, first by the recitations of the children, and then by sensible and well-timed addresses from the visiters appointed, so that the whole mind of the neighborhood should be most favorably and deeply impressed of the advantages of moral and intellectual instruction, and its value enhanced in popular estimation a hundred fold:—I warrant they will then be disposed to open their hearts, and to contribute much more largely to the improvement of themselves and children, than they now do;—no longer regarding it as an object of merely secondary, but of the very first importance. And one such example in a district would take; it would be followed all over the country. But it would be necessary that it should originate in the district itself, and although the principal

speaker might be brought from another quarter, the fewer school-masters there, perhaps the better. People like to have the credit of originating their own amusements, and means of advancement; and I do not wonder at it; considering how many are clamorous to appropriate to themselves the credit of all the good that is done in a country. And here, lest I also should come in for my share of condemnation in this respect, and may seem to claim the credit of having suggested something, I beg leave to tell you that this whole proposition of having these examinations and lectures in country district schools is not mine, but that of a Director of one of the Schools here, an intelligent farmer, and who is actually now taking steps to carry it into execution: but the greatest impediment I believe he finds, is in the Teacher, who dislikes very much that any of these novelties should disturb him in the even tenor of his way; but even he at last would find his advantage in it. Exhibitions of schools in cities are often carried too far, and may divert the Teacher from what is *solid* to what is *superficial*,—a great evil in the higher branches of Education; but in the country there is none of this danger, for here there is too little exhibition; Education is not *seen* at all, and consequently is despised: but she has *native* graces,—even *rural* charms,—a simplicity and sweetness of demeanor, that can strike even the rudest heart. But at present, how can you expect the countryman to be enamoured with Education, who can only think of her shut up in some miserable hovel the live-long day,—keeping company with some unfortunate wretch doomed to teaching, because unable to work, and unprovided with other means of support: and his pupils feel no better satisfied than he does himself. The wisest even, and the best, require the sympathy and approbation of their fellow creatures occasionally; but children live upon it, and can learn nothing without it. Let the old and the young mingle once or twice every three months around the rural school-house, and make a cheerful holiday, sanctioned and attempered, and therefore only gladdened the more by the presence of a Benignant Religion, which, on that day, at least, if not on others, should address the people in the language of intelligible duties, and show them that it is not her only design to bring them to Heaven, but to make them useful and happy here;—obedient and manly sons;—sensible and kind-hearted daughters;—to make Fathers considerate, and wise, and temperate; Mothers careful, orderly, discreet, and judicious. In short, along the path-ways of all moral and civil, and domestic and familiar duties, to lead men quietly and securely to the destined ends of their Creation;—to make them first virtuous and then happy.

This is said to be a reading age, but three-fourths of mankind will not read, to be *effectually* benefitted. The various publications on Education, which are about, may be read by one-fourth, but the three-fourths must be spoken to: and truly sensible men,

who have the gift of speaking intelligibly to the people, in those country meetings, can do more for this sacred cause, than he who writes. A hundred people disperse after the meeting, their several ways;—and if his reasons were *plain* and *strong* and *handle-able*, they are taken up again by each man in his own way, among his neighbors, and shown in a thousand new and familiar lights. The ideas of Education become incorporated in their minds; their former notions of it vanish; they see that its real design is to give a man entire use and possession of his own *hands* and *understanding*, and to show him how best to use both to the glory of God and good of men.

These are *practicable results*, that can be accomplished by the moral will of individuals, planted up and down in school districts; on *these* all depends; *these* constitute the *Legislature of Education;* with them is deposited that treasury of moral worth, which if faithfully disbursed, will do more for the resuscitation of Right Education, than if the entire surplus revenue, a hundred times doubled, were devoted to that end. After all, Education is Wisdom, and can neither be *bought* nor *sold*, but is inwrought into the soul of a nation, through individual efforts, and the blessings of Divine Providence upon them.

A.

Montgomery County, Ohio, July 24.

FEMALE EDUCATION.*

NO. I.

A great deal has been said of the original difference of capacity between men and women; as if women were more quick, and men more judicious—as if women were more remarkable for delicacy of association, and men for stronger powers of attention. All this, we confess, appears to us very fanciful. That there is a difference in the understandings of the men and the women we every

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* Abridged from Edin. Rev.

The views here expressed concerning the importance of giving to females a much more solid and extensive education than is at present fashionable, are precisely those which we wish to see widely diffused and acted upon in the United States.

day meet with, every body, we suppose, must perceive; but there is none surely, which may not be accounted for by the difference of circumstances in which they have been placed, without referring to any conjectural difference of original conformation of mind. As long as boys and girls run about in the dirt, and trundle hoops together, they are both precisely alike. If you catch up one half of these creatures, and train them to a particular set of actions and opinions, and the other half to a perfectly opposite set, of course their understandings will differ, as one or the other sort of occupations has called this or that talent into action; there is surely no occasion to go into any deeper or more abstruse reasoning, in order to explain so very simple a phenomenon. Taking it, then, for granted, that nature has been as bountiful of understanding to one sex as the other, it is incumbent on us to consider what are the principal objections commonly made against the communication of a greater share of knowledge to women, than commonly falls to their lot at present; for though it may be doubted whether women should learn all that men learn, the immense disparity which now exists between their knowledge, we should hardly think could admit of any rational defence. It is not easy to imagine that there can be any just cause why a woman of forty should be more ignorant than a boy of twelve years of age. If there be any good at all in female ignorance, this (to use a very colloquial phrase) is surely too much of a good thing.

Something in this question must depend, no doubt, upon the leisure which either sex enjoys for the cultivation of their understandings;—and we cannot help thinking, that women have fully as much, if not more idle time upon their hands, than men. Women are excluded from all the serious business of the world: men are lawyers, physicians, clergymen, apothecaries, and justices of the peace—sources of exertion which consume a great deal more time than rearing children; so that, if the thing is a thing that ought to be done—if the attainments of literature are objects really worthy the attention of females, they cannot plead the want of leisure as an excuse for indolence and neglect. The lawyer who passes his day in exasperating the bickerings of Roe and Doe, is certainly as much engaged as his lady who has the whole of the morning before her to correct the children and pay the bills. The apothecary who rushes from an act of phlebotomy in the western parts of the town to insinuate a bolus in the east, is surely as completely absorbed as that fortunate female who is darning the garment, or preparing the repast of her Æsculapius at home; and in every degree and situation of life, it seems that men must necessarily be exposed to more serious demands upon their time and attention, than can possibly be the case with respect to the other sex. We are speaking always of the fair demands which ought to be made upon the time and attention of women; for, as the matter now

stands, the time of women is considered as worth nothing at all. Daughters are kept to occupations in sewing, patching, mantua-making and mending, by which it is impossible they can earn ten pence a day. The intellectual improvement of women is considered to be of such subordinate importance, that twenty pounds paid for needle-work would give to a whole family leisure to acquire a fund of real knowledge. They are kept with nimble fingers and vacant understandings, till the season for improvement is utterly passed away, and all chance of forming more important habits completely lost. We do not therefore say that women have more leisure than men, if it be necessary they should lead the life of artisans; but we make this assertion only upon the supposition, that it is of some importance women should be instructed; and that many ordinary occupations, for which a little money will find a better substitute, should be sacrificed to this consideration.

We bar, in this discussion, any objection which proceeds from the mere novelty of teaching women more than they are already taught. It may be useless that their education should be improved, or it may be pernicious; and these are the fair grounds on which the question may be argued. But those who cannot bring their minds to consider such an unusual extension of knowledge, without connecting with it some sensation of the ludicrous, should remember, that in the progress from absolute ignorance, there is a period when cultivation of mind is new to every rank and description of persons. A century ago, who would have believed that country gentlemen could be brought to read and spell with the ease and accuracy, which we now so frequently remark,—or supposed that they could be carried up even to the elements of ancient and modern history? Nothing is more common or more stupid, than to take the actual for the possible—to believe that all which is, is all that can be; first to laugh at every proposed deviation from practice as impossible—then, when it is carried into effect, to be astonished that it did not take place before.

It is said, that the effect of knowledge is to make women pedantic and affected; and that nothing can be more offensive, than to see a woman stepping out of the natural modesty of her sex, to make an ostentatious display of her literary attainments. This may be true enough; but the answer is so trite and obvious, that we are almost ashamed to make it. All affectation and display proceed from the supposition of possessing something better than the rest of the world possesses. Nobody is vain of possessing two legs and two arms;—because that is the precise quantity of either sort of limb which every body possesses. Who ever heard a lady boast that she understood French?—for no other reason, that we know of, but because every body in these days does understand French; and though there may be some disgrace in being ignorant of that language, there is little or no merit in its acquisition. Dif-

fuse knowledge generally among women, and you will at once cure the conceit which knowledge occasions while it is rare. Vanity and conceit we shall of course witness in men and women as long as the world endures: but by multiplying the attainments upon which these feelings are founded, you increase the difficulty of indulging them, and render them much more tolerable, by making them the proofs of a much higher merit. When learning ceases to be uncommon among women, learned women will cease to be affected.

A great many of the lesser and more obscure duties of life, necessarily devolve upon the female sex. The arrangement of all household matters, and the care of children in their early infancy, must of course depend upon them. Now, there is a very general notion, that the moment you put the education of women upon a better footing than it is at present, at that moment there will be an end of all domestic economy; and that, if you once suffer women to eat of the tree of knowledge, the rest of the family will very soon be reduced to the same kind of ærial and unsatisfactory diet. These, and all such opinions, are referable to one great and common cause of error;—that man does every thing, and that nature does nothing; and that every thing we see, is referable to positive institution, rather than to original feeling. Can any thing, for example, be more perfectly absurd than to suppose, that the care and perpetual solicitude which a mother feels for her children, depends upon her ignorance of Greek and Mathematics: and that she would desert an infant for a quadratic equation? We seem to imagine that we can break in pieces the solemn institution of nature, by the little laws of a boarding school; and that the existence of the human race depends upon teaching women a little more, or a little less;—that Cimmerian ignorance can aid parental affection, or the circle of arts and sciences produce its destruction. In the same manner, we forget the principles upon which the love of order, arrangement, and all the arts of economy depend. They depend not upon ignorance nor idleness; but upon the poverty, confusion and ruin which would ensue from neglecting them. Add to these principles, the love of what is beautiful and magnificent, and the vanity of display;—and there can surely be no reasonable doubt, but that the order and economy of private life is amply secured from the perilous inroads of knowledge.

We would fain know, too, if knowledge is to produce such baneful effects upon the maternal and the household virtues, why this influence has not already been felt? Women are much better educated now than they were a century ago; but they are by no means less remarkable for attention to the arrangements of their household, or less inclined to discharge the offices of parental affection. It would be very easy to show, that the same objection has been made at all times to every improvement in the education of

both sexes, and all ranks,—and been as uniformly and completely refuted by experience. A great part of the objections made to the education of women, are rather objections made to human nature, than to the female sex: for it is surely true, that knowledge, where it produces any bad effects at all, does as much mischief to one sex as to the other,—and gives birth to fully as much arrogance, inattention to common affairs, and eccentricity among men, as it does among women. But it by no means follows, that you get rid of vanity and self-conceit, because you get rid of learning. Self-complacency can never want an excuse; and the best way to make it more tolerable, and more useful, is to give to it as high, and as dignified an object as possible. But at all events, it is unfair to bring forward against a part of the world an objection which is equally powerful against the whole. When foolish women think they have any distinction, they are apt to be proud of it; so are foolish men. But we appeal to any one who has lived with cultivated persons of either sex, whether he has not witnessed as much pedantry, as much wrong-headedness, as much arrogance, and certainly a great deal more rudeness, produced by learning in men, than in women: therefore, we should make the accusation general —or dismiss it altogether; though, with respect to pedantry, the learned are certainly a little unfortunate, that so very emphatic a word, which is occasionally applicable to all men embarked eagerly in any pursuit, should be reserved exclusively for them: for, as pedantry is an ostentatious obtrusion of knowledge, in which those who hear us cannot sympathise, it is a fault of which soldiers, sailors, sportsmen, gamesters, cultivators, and all men engaged in a particular occupation, are quite as guilty as scholars; but they have the good fortune to have the vice only of pedantry,—while scholars have both the vice, and the name for it too.

Some persons are apt to contrast the acquisition of important knowledge with what they call simple pleasures; and deem it more becoming that a woman should educate flowers, make friendships with birds, and pick up plants, than enter into more difficult and fatiguing studies. If a woman has no taste and genius for higher occupations, let her engage in these, to be sure, rather than remain destitute of any pursuit. But why are we necessarily to doom a girl, whatever be her taste or her capacity, to one unvaried line of petty and frivolous occupation? If she is full of strong sense, and elevated curiosity, can there be any reason why she should be diluted and enfeebled down to a mere culler of simples, and fancier of birds?—why books of history and reasoning are to be torn out of her hand, and why she is to be sent, like a butterfly, to hover over the idle flowers of the field? Such amusements are innocent to those whom they can occupy; but they are not innocent to those who have too powerful understandings to be occupied by them. Light broths and fruits are innocent food only to weak or

infant stomachs; but they are poison to that organ in its perfect and mature state. But the great charm appears to be in the word *simplicity*—simple pleasures! If by a simple pleasure is meant an innocent pleasure, the observation is best answered by showing, that the pleasure which results from the acquisition of important knowledge is quite as innocent as any pleasure whatever; but if by a simple pleasure is meant one, the cause of which can be easily analyzed, or which does not last long, or which in itself is very faint; then simple pleasures seem to be very nearly synonymous with small pleasures; and if the simplicity were to be little increased, the pleasure would vanish altogether.

As it is impossible that every man should have industry or activity sufficient to avail himself of the advantages of education, it is natural that men who are ignorant themselves, should view, with some degree of jealousy and alarm, any proposal for improving the education of women. But such men may depend upon it, however the system of female education may be exalted, that there will never be wanting a due proportion of failures; and that after parents, guardians and preceptors have done all in their power to make every body wise, there will still be a plentiful supply of women who have taken special care to remain otherwise; and they must rest assured, if the utter extinction of ignorance and folly is the evil they dread, that their interests will always be effectually protected, in spite of every exertion to the contrary.

We must in candor allow, that those women who begin, will have something more to overcome than may probably hereafter be the case. We cannot deny the jealousy which exists among pompous and foolish men, respecting the education of women. There is a class of pedants, who would be cut short in the estimation of the world a whole cubit, if it were generally known that a young lady of eighteen could be taught to decline the tenses of the middle voice, or acquaint herself with the Æolic varieties of that celebrated language. Then women have, of course, all ignorant men for enemies to their instruction, who being bound, (as they think,) in point of sex, to know more, are not well pleased, in point of fact, to know less. But, among men of sense and liberal politeness, a woman, who has successfully cultivated her mind, without diminishing the gentleness and propriety of her manners, is always sure to meet with a respect and attention bordering upon enthusiasm.

There is in either sex a strong and permanent disposition to appear agreeable to the other: and this is the fair answer to those who are fond of supposing, that an higher degree of knowledge would make women rather the rivals than the companions of men. Presupposing such a desire to please, it seems much more probable, that a common pursuit should be a fresh source of interest, than a cause of contention. Indeed, to suppose that any mode of educa-

tion can create a general jealousy and rivalry between the sexes, is so very ridiculous, that it requires only to be stated in order to be refuted. The same desire of pleasing, secures all that delicacy and reserve which are of such inestimable value to women. We are quite astonished, in hearing men converse on such subjects, to find them attributing such beautiful effects to ignorance. It would appear, from the tenor of such objections, that ignorance had been the great civilizer of the world. Women are delicate and refined, only because they are ignorant;—they manage their household, only because they are ignorant;—they attend to their children, only because they know no better. Now, we must really confess, we have all our lives been so ignorant as not to know the value of ignorance. We have always attributed the modesty and the refined manners of women, to their being well taught in moral and religious duty,—to the hazardous situation in which they are placed,—to that perpetual vigilance which it is their duty to exercise over thought, word, and action,—and to that cultivation of the mild virtues, which those who cultivate the stern and magnanimous virtues expect at their hands. After all, let it be remembered, we are not saying there are no objections to the diffusion of knowledge among the female sex. We would not hazard such a proposition respecting any thing; but we are saying, that, upon the whole, it is the best method of employing time; and that there are fewer objections to it, than to any other method. There are, perhaps, 50,000 females in Great Britain, who are exempted by circumstances from all necessary labor: but every human being must do something with their existence; and the pursuit of knowledge is, upon the whole, the most innocent, the most dignified, and the most useful method of filling up that idleness, of which there is always so large a portion in nations far advanced in civilization. Let any man reflect, too, upon the solitary situation in which women are placed,—the ill treatment to which they are sometimes exposed, and which they must endure in silence, and without the power of complaining,—and he must feel convinced that the happiness of a woman will be materially increased, in proportion as education has given to her the habit and the means of drawing her resources from herself.

There are a few common phrases in circulation respecting the duties of women, to which we wish to pay some degree of attention, because they are rather inimical to those opinions which we have advanced on this subject. Indeed, independently of this, there is nothing which requires more vigilance than the current phrases of the day, of which there are always some resorted to in every dispute, and from the sovereign authority of which it is often vain to make any appeal. 'The true theatre for a woman is the sick chamber;'—'Nothing so honorable to a woman, as not to be spoken of at all.' These two phrases, the delight of *Noodledom*,

are grown into common-places upon the subject; and are not unfrequently employed to extinguish that love of knowledge in women, which, in our humble opinion, it is of so much importance to cherish. Nothing, certainly, is so ornamental and delightful in women as the benevolent virtues; but time cannot be filled up, and life employed, with high and impassioned virtues. Some of these feelings are of rare occurrence—all of short duration—or nature would sink under them. A scene of distress and anguish is an occasion where the finest qualities of the female mind may be displayed; but it is a monstrous exaggeration to tell women that they are born only for scenes of distress and anguish. Nurse father, mother, sister and brother, if they want it;—it would be a violation of the plainest duties to neglect them. But, when we are talking of the common occupations of life, do not let us mistake the accidents for the occupations;—when we are arguing how the twenty-three hours of the day are to be filled up, it is idle to tell us of those feelings and agitations above the level of common existence, which may employ the remaining hour. Compassion, and every other virtue, are the great objects we all ought to have in view; but no man (and no woman) can fill up the twenty-four hours by acts of virtue. But one is a lawyer, and the other a ploughman, and the third a merchant; and then, acts of goodness, and intervals of compassion and fine feeling, are scattered up and down the common occupations of life. We know women are to be compassionate; but they cannot be compassionate from eight o'clock in the morning till twelve at night;—and what are they to do in the interval? This is the only question we have been putting all along, and is all that can be meant by literary education.

Then, again, as to the notoriety which is incurred by literature. The cultivation of knowledge is a very distinct thing from its publication; nor does it follow that a woman is to become an author, merely because she has talent enough for it. We do not wish a lady to write books,—to defend and reply,—to squabble about the tomb of Achilles, or the plain of Troy,—any more than we wish her to dance at the opera, to play at a public concert, or to put pictures in the exhibition, because she has learned music, dancing and drawing. The great use of her knowledge will be, that it contributes to her private happiness. She may make it public; but it is not the principal object which the friends of female education have in view. Among men, the few who write bear no comparison to the many who read. We hear most of the former, indeed, because they are, in general, the most ostentatious part of literary men; but there are innumerable men, who, without ever laying themselves before the public, have made use of literature to add to the strength of their understandings, and to improve the happiness of their lives. After all, it may be an evil for ladies to be talked of: But

we really think those ladies who are talked of only as Miss Edgeworth, Mrs. Barbauld, and Mrs. Hamilton are talked of, may bear their misfortunes with a very great degree of Christian patience; and such singular examples of ill fortune, may perhaps render the school of adversity a little more popular than it is at present.

Their exemption from all the necessary business of life, is one of the most powerful motives for the improvement of education in women. Lawyers and physicians have in their professions a constant motive to exertion; if you neglect their education, they must in a certain degree educate themselves by their commerce with the world: they must learn caution, accuracy, and judgment, because they must incur responsibility. But if you neglect to educate the mind of a woman, by the speculative difficulties which occur in literature, it can never be educated at all; if you do not effectually rouse it by education, it must remain for ever languid. Uneducated men may escape intellectual degradation; uneducated women cannot. They have nothing to do; and if they come untaught from the schools of education, they will never be instructed in the school of events.

Women have not their livelihood to gain by knowledge; and that is one motive for relaxing all those efforts which are made in the education of men. They certainly have not; but they have happiness to gain, to which knowledge leads as probably as it does to profit; and that is a reason against mistaken indulgence. Besides, we conceive the labor and fatigue of accomplishments to be equal to the labor and fatigue of knowledge; and that it takes quite as many years to be charming, as it does to be learned.

Another difference of the sexes is, that women are attended to, and men attend. All acts of courtesy and politeness originate from the one sex, and are received by the other. We can see no sort of reason, from this diversity of condition, for giving to women a trifling and insignificant education; but we see in it a very powerful reason for strengthening their judgment, and inspiring them with the habit of employing time usefully. We admit many striking differences in the situation of the two sexes, and many striking differences of understanding, proceeding from the different circumstances in which they are placed: but there is not a single difference of this kind which does not afford a new argument for making the education of women better than it is. They have nothing serious to do;—is that a reason why they should be brought up to do nothing but what is trifling? They are exposed to greater dangers;—is that a reason why their faculties are to be purposely and industriously weakened? They are to form the characters of future men;—is that a cause why their own characters are to be broken and frittered down as they now are? In short, there is not a single trait in that diversity of circumstances, in which the two sexes are placed, that does not decidedly prove the magnitude of

the error we commit in neglecting (as we do neglect,) the education of women.

If the objections against the better education of women could be overruled, one of the great advantages that would ensue, would be the extinction of innumerable follies. A decided and prevailing taste for one or another mode of education there must be. A century past, it was for housewifery,—now it is for accomplishments. The object now is, to make women artists,—to give them an excellence in drawing, music, painting and dancing,—of which, persons who make these pursuits the occupation of their lives, and derive from them their subsistence, need not be ashamed. Now, one great evil of all this is, that it does not last. If the whole of life, as somebody says, were an Olympic game,—if we could go on feasting and dancing to the end,—this might do: but this is merely a provision for the little interval between coming into life, and settling in it; while it leaves a long and dreary expanse behind, devoid both of dignity and cheerfulness. No mother, no woman who has passed over the few first years of life, sings, or dances, or draws, or plays upon musical instruments. These are merely means for displaying the grace and vivacity of youth, which every woman gives up, as she gives up the dress and the manners of eighteen: she has no wish to retain them; or, if she has, she is driven out of them by laughter and derision. The system of female education, as it now stands, aims only at embellishing a few years of life, which are in themselves so full of grace and happiness, that they hardly want it; and then leaves the rest of existence a miserable prey to idle insignificance. No woman of understanding and reflection can possibly conceive she is doing justice to her children by such kind of education. The object is, to give to children resources that will endure as long as life endures, —habits that time will ameliorate, not destroy,—occupations that will render sickness tolerable, solitude pleasant, age venerable, life more dignified and useful, and therefore death less terrible: and the compensation which is offered for the omission of all this, is a short-lived blaze,—a little temporary effect, which has no other consequence than to deprive the remainder of life of all taste and relish. There may be women who have a taste for the fine arts, and who evince a decided talent for drawing, or for music. In that case, there can be no objection to their cultivation; but the error is, to make these things the grand and universal object,—to insist upon it that every woman is to sing, and draw, and dance—with nature or against nature,—to bind her apprentice to some accomplishment, and, if she cannot succeed in oil or water-colours, to prefer gilding, varnishing, burnishing, box-making, or shoemaking, to real and solid improvement in taste, knowledge, and understanding.

A great deal is said in favor of the social nature of the fine arts. Music gives pleasure to others. Drawing is an art, the amusement of which does not centre in him who exercises it, but is diffused among the rest of the world. This is true; but there is nothing, after all, so social as a cultivated mind. We do not mean to speak slightingly of the fine arts, or to depreciate the good humor with which they are sometimes exhibited; but we appeal to any man, whether a little spirited and sensible conversation—displaying, modestly, useful acquirements—and evincing rational curiosity, is not well worth the highest exertions of musical or graphical skill. A woman of accomplishments may entertain those who have the pleasure of knowing her for half an hour with great brilliancy; but a mind full of ideas, and with that elastic spring which the love of knowledge only can convey, is a perpetual source of exhilaration and amusement to all that come within its reach;—not collecting its force into single and insulated achievements, like the efforts made in the fine arts—but diffusing, equally over the whole of existence, a calm pleasure—better loved as it is longer felt—and suitable to every variety and every period of life. Therefore, instead of hanging the understanding of a woman upon walls, or hearing it vibrate upon strings,—instead of seeing it in clouds, or hearing it in the wind,—we would make it the first spring and ornament of society, by enriching it with attainments upon which alone such power depends.

The education of women must be important, as the formation of character for the first seven or eight years of life seems to depend almost entirely upon them. It is certainly in the power of a sensible and well educated mother to inspire, within that period, such tastes and propensities as shall nearly decide the destiny of the future man; and this is done, not only by the intentional exertions of the mother, but by the gradual and insensible imitation of the child; for there is something extremely contagious in greatness and rectitude of thinking, even at that age; and the character of the mother with whom he passes his early infancy, is always an event of the utmost importauce to the child. A merely accomplished woman cannot infuse her tastes into the minds of her sons; and, if she could, nothing would be more unfortunate than her success. Besides, when her accomplishments are given up, she has nothing left for it but to amuse herself in the best way she can; and, becoming entirely frivolous, either declines the fatigue of attending to her children, or, attending to them, has neither talents nor knowledge to succeed: and therefore, here is a plain and fair answer to those who ask so triumphantly, Why should a woman dedicate herself to this branch of knowledge? or why should she be attached to such science?—because, by having gained information on these points, she may inspire her son with valuable tastes, which may abide by him through life, and carry him up to all the

sublimities of knowledge;—because she cannot lay the foundation of a great character, if she is absorbed in frivolous amusements, nor inspire her child with noble desires, when a long course of trifling has destroyed the little talents which were left by a bad education.

It is of great importance to a country, that there should be as many understandings as possible actively employed within it. Mankind are much happier for the discovery of barometers, thermometers, steam-engines, and all the innumerable inventions in the arts and sciences. We are every day and every hour reaping the benefit of such talent and ingenuity. The same observation is true of such works as those of Dryden, Pope, Milton, and Shakspeare. Mankind are much happier that such individuals have lived and written;—they add every day to the stock of public enjoyment—and perpetually gladden and embellish life. Now, the number of those who exercise their understanding to any good purpose, is exactly in proportion to those who exercise it at all; but, as the matter stands at present, half the talent in the universe runs to waste, and is totally unprofitable. It would have been almost as well for the world, hitherto, that women, instead of possessing the capacities they do at present, should have been born wholly destitute of wit, genius, and every other attribute of mind of which men make so eminent an use: and the ideas of use and possession are so united together, that, because it has been the custom in almost all countries to give to women a different and a worse education than to men, the notion has obtained that they do not possess faculties which they do not cultivate. Just as, in breaking up a common, it is sometimes very difficult to make the poor believe it will carry corn, merely because they have been hitherto accustomed to see it produce nothing but weeds and grass —they very naturally mistake its present condition for its general nature.

If the possession of excellent talents is not a conclusive reason why they should be improved, it at least amounts to a very strong presumption; and if it can be shown that women may be trained to reason and imagine as well as men, the strongest reasons are certainly necessary to show us why we should not avail ourselves of such rich gifts of nature; and we have a right to call for a clear statement of those perils which make it necessary that such talents should be totally extinguished, or, at most, very partially drawn out. The burden of proof does not lie with those who say, Increase the quantity of talent in any country as much as possible—for such a proposition is in conformity with every man's feelings: but it lies with those who say, Take care to keep that understanding weak and trifling, which nature has made capable of becoming strong and powerful. The paradox is with them, not with us. In all human reasoning, knowledge must be taken for a good, till it

can be shown to be an evil. But now, Nature makes to us rich and magnificent presents; and we say to her—You are too luxuriant and munificent—we must keep you under, and prune you;—we have talents enough in the other half of creation;—and, if you will not stupify and enfeeble the mind of women to our hands, we ourselves must expose them to a narcotic process, and educate away that fatal redundance with which the world is afflicted, and the order of sublunary things deranged.

The Elements of Arithmetic, By Joseph Ray, M. D., Professor of Mathematics, Woodward College. Cincinnati—1837.

We have received a copy of this Arithmetic, and examined it with attention. It possesses the rare modesty of promising no more than in good faith it performs. The mathematical pursuits of Dr. Ray have peculiarly fitted him to give us a good and substantial work on this subject. There is nothing superfluous; and every rule is briefly and clearly illustrated. The examples are copious and well chosen. Instead of filling up his pages with *pictures* after the manner of Emerson and Colburn, (we believe we have the right names,) he has given us pages of plain and valuable matter. As an elementary work, we know of none superior, and we speak our sincere sentiments, when we recommend *this* work, to the attention of educators.

The "*Lot of School Books*," Readers, Arithmetics, etc. etc., sent us by a Philadelphia book-seller, was received in due time. The Editor expressed his views at large, relative to Question Books, and the whole system of question and picture books for schools, in the last number of the Academician, under the head of *Elementary Books* (page 358). The publisher of "the lot of school-books" will refer to it for an expression of the Editor's sentiments on these matters. He hopes soon to see every written question, and every picture book, from the Symbolical Spelling Book down to the fooleries of Peter Parley, driven by common consent out of Academical Institutions. The good work is going on; and its result cannot be doubted, where intelligence is found.

ABSTRACT OF METEOROLOGICAL OBSERVATIONS

FOR THE MONTH OF AUGUST, 1837, TAKEN AT WOODWARD COLLEGE, CINCINNATI—BY JOSEPH RAY, M. D., PROF. MATH.

Aug. 1837.	Thermometer. min	max	m tp	Barom. mn ht inches	Course wind AM	PM.	charac'r wind	rain	charac'r weather.	Miscellany.
● 1	60.0	87.0	76.5	29.251	E--E		lt. bre		clear	
2	68.0	86.0	78.5	29.251	SE-SE		lt. bre		variable	
3	75.0	90.0	75.3	29.235	E-E		str. bre	·31	cloudy	ther. sunk fm
4	63.0	79.0	68.8	29.411	N-N		lt. wd		fair	90° to 70° in
5	56.0	79.0	71.2	29.445	SE-SE		lt. wd		clear	20 minutes
6	73.0	75.0	73.7	29.463	E-E		lt. wd	·06	variable	
7	71.0	88.0	80.5	29.411	SE-SE		lt. bre		cloudy	
8	70.0	77.0	74.2	29.263	E-SE		lt. wd	·82	cloudy	wet day
◐ 9	73.0	86.0	77.3	29.263	SW-SW		lt. wd	·39	variable	wet morning
10	69 0	86.0	75.2	29.231	W-W		lt. bre		cloudy	
11	68.0	83.0	73.2	29.197	SW-SW		lt. bre	·31	cloudy	
12	63.0	80.0	69.7	29.321	W W		lt. bre		variable	
13	61.0	80.0	68.2	29.481	NW--NW		lt. bre		fair	
14	61.0	85.0	68.5	29.443	NW-W		str. bre		fair	
15	57.0	81.0	69.3	29.397	W-W		lt. bre		fair	
○ 16	63.0	80.0	67.8	29.361	S-NW		str, wd	·93	cloudy	heavy rn 1 pm
17	58.0	93.0	75.3	29.353	W-NW		str. wd	1·31	variable	
18	66.0	85.0	76.8	29.351	NW--NW		lt. bre		variable	clou a. m. fair
19	64.0	83.0	72.7	29.327	NW--NW		str. bre		clear	p m
20	66.0	88.0	75.2	29.307	N-NW		lt. bre	·56	variable	wet afternoon
21	65.0	85.0	68.2	29.183	W-NW		str. wd	·18	variable	windy ev en'g
◑ 22	52.0	71.0	58.5	29.313	NW--NW		lt. wd		clear	
23	53.0	75.0	62.7	29.307	NW--NW		lt. wd		variable	
24	57.0	79.0	65.3	29.233	W-W		lt. wd		fair	
25	57.0	84.0	73.2	29.181	E-E		lt. bre		varlable	
26	69.0	86.0	74.7	29.211	SW-SW		lt. wd	·36	cloudy	wet afternoon
27	68.0	83.0	76.0	29.373	SW-SW		lt. wd		cloudy	
28	70.0	88.0	77.2	29.403	SW-SW		lt. bre		fair	
29	69.0	94.0	80.2	29.346	SW-SW		lt. bre		fair	very sultry
30	72.0	94.0	79.3	29.243	SW-W		lt. bre	·22	clear	wet night
31	57.0	68.0	60.8	29.311	NW-N		lt. wd	·46	variable	wet morning

Mean temperature of the air (Fahrenheit's scale) 72°·4
Maximum height of thermometer 94°.
Minimum height of thermometer 52°.
Range of thermometer 42°.
Warmest day, August 7th.
Coldest day, Aug. 22d.
Mean height of barometer, (English inches,) 29·3175
Maximum height of barometer, 29.49
Minimum height of barometer, 29·15
Range of barometer, 0·34
Perpendicular depth of rain (Eng. inches) 5·91

Direction of Wind.—N. 2 days—E. 4½ days—S. E. 3½ days—S. ½ day—S. W. 6½ days—W. 6 days—N. W. 8 days.

Weather.—Clear and fair 12 days—variable 11 days—cloudy 8 days.

The mean temperature of this month differed from that of the same month 1836, only two-tenths of a degree; the maximum temperature was a degree less, and the quantity of rain nearly the same as in Aug. 1836.